SECTION 6.0

6.0 REFERENCES FOR SECTIONS 1.0 THROUGH 5.0

1. United States Geological Survey. Telford, Pennsylvania Quadrangle, 7.5 Minute Series. Topographic Map. 1960, photorevised 1969 and 1973. Combined with Perkiomenville, Pennsylvania Quadrangle, 7.5 Minute Series. Topographic Map. 1960, photorevised 1969 and 1973; Doylestown, Pennsylvania Quadrangle, 7.5 Minute Series. Topographic Map. 1953, photorevised 1983; Milford Square, Pennsylvania Quadrangle, 7.5 Minute Series. Topographic Map. 1957, photorevised 1968 and 1973; Quakertown, Pennsylvania Quadrangle, 7.5 Minute Series. Topographic Map. 1957, photorevised 1968 and 1973; and Bedminster, Pennsylvania Quadrangle, 7.5 Minute Series. Topographic Map. 1957, photorevised 1983.

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23. National Oceanic and Atmospheric Administration. Climatography of the United States. Local Climatological Data. Climate of Pennsylvania; Summary of Allentown, Pennsylvania. 1983.

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25. United States Department of Commerce, United States Printing Office. Rainfall Frequency Atlas of the United States. Technical Paper No. 40, 1963.

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28. United States Geological Survey. Telford, Pennsylvania Quadrangle, 7.5 Minute Series. National Wetlands Inventory. April 1981. Combined with Perkiomenville, Pennsylvania Quadrangle, 7.5 Minute Series. National Wetlands Inventory. May 1981; Doylestown, Pennsylvania Quadrangle, 7.5 Minute Series. National Wetlands Inventory. April 1981; Milford Square, Pennsylvania Quadrangle, 7.5 Minute Series. National Wetlands Inventory. May 1981; and Quakertown, Pennsylvania Quadrangle, 7.5 Minute Series. National Wetlands Inventory. April 1981.

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SECTION 7.0

7.0 LABORATORY DATA

7.1 SAMPLE DATA SUMMARY

The attached data summary contains only compounds which were identified as detected in at least one sample. The complete list of compounds analyzed for, their results, and the associated detection limits are located as an appendix. Results for tentatively identified compounds appear following the organic data section of this report.

The following codes are used in the data summary to indicate the confidence in the laboratory results:

CODES RELATING TO IDENTIFICATION
(confidence concerning presence or absence of compounds):

U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.

(NO CODE) = Confirmed identification.

B = Not detected substantially above the level reported in laboratory or field blanks.

R = Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.

N = Tentative identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.

CODES RELATED TO QUANTITATION
(can be used for both positive results and sample quantitation limits):

J = Analyte present. Reported value may not be accurate or precise.

K = Analyte present. Reported value may be biased high. Actual value is expected to be lower.

L = Analyte present. Reported value may be biased low. Actual value is expected to be higher.

UJ = Not detected, quantitation limit may be inaccurate or imprecise.

UL = Not detected, quantitation limit is probably higher.

OTHER CODES

Q = No analytical result.

SITE NAME: INACTIVE LANDFILL SAMPLING DATE(s): 12/05/91 STATE/COUNTY CODE:
TDD NUMBER: F3-3263-05 CASE NUMBER:17514 EPA NUMBER:
LAB NAMES: ORGANIC: COMPUCHEM, RTP INORGANIC: ITAS, PITTSBURGH

SAMPLE NUMBER:	CJP21	CJP22	CJP23	CJP24	CJP25	CJP26	CJP27	CJP28	CJP29	CJP30	CJP38	CJP52	CJP53
SAMPLE ID:	PW-1	HW-1		SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW-7	SD-1	SD-2	SD-3
LOCATION:	SBMWW MUNICIPAL SUPPLY WELL No.5 9TH ST.	FAITH BAPTIS T CHURCH NORTH MAIN STREET	E-6	110' ENE OF BRICK BLDG. NORTH AREA INTERM. STR.	AT DISCHARGE PT. OF 18"- DIA. PIPE SO UTH OF LANDF	100' DOWN STREAM OF SW-2 IN IN- TERM. STEAM	100'UPSTREAM FROM SBMWW MUN. SUPPLY WELL NO. 5	100'DNSTEAM OF RTE.309 IN PERINNIAL STREAM	200'DNSTREAM FROM LOCATIN SW-5	dup SW-2	SAME AS SW-1 LOCATIO	alongside rusted discharge pipe	SAME AS SW-3 LOCA- TION.
PH:	7.5	7.2		7.0	7.0	7.1	7.1	7.1	7.1	6.9	7.2	7.2	7.4
FIELD MEASUREMENTS:	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONR	NONE	NONE	NONE
PERCENT SOLIDS:											64.0%	70.0%	74.0%
TYPE OF DATA: ****** VOLATILES	**********												
DILUTION FACTOR:	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.6	1.4	1.4

DET. LIMIT CRQL (*=IDL)	SAMPLE NUMBER: UNITS:	CJP21 ug/l	CJP22 ug/l	CJP23 ug/l	CJP24 ug/l	CJP25 ug/l	CJP26 ug/l	CJP27 ug/l	CJP28 ug/l	CJP29 ug/l	CJP30 ug/l	CJP38 ug/kg	CJP52 ug/kg	CJP53 ug/kg
10.00	vinyl chloride					21.00 J	23.00 J				16.00 J			
10.00	methylene chloride	15.00 B	11.00 B	12.00 B	5.00 B	7.00 B	19.00 B	10.00 B	27.00 B	7.00 B	8.00 B	54.00 B	43.00 B	45.00 B
10.00	acetone											59.00 B	39.00 B	
10.00	1,1-dichloroethane					2.00J	3.00J				2.00J		8.00J	3.00J
10.00	1,2-dichloroethene(total)	1.00J				36.00	64.00	4.00J			33.00		27.00	76.00
10.00	chloroform						5.00 B	2.00 B	3.00 B					
5.00	1,1,1-trichloroethane					3.00J	8.00J				2.00J			16.00
10.00	trichloroethene	34.00				4.00J	14.00	1.00J			5.00J			3.00J
10.00	benzene													
10.00	tetrachloroethene	3.00J					9.00J				1.00J			
10.00	toluene										1.00 B			
10.00	ethylbenzene													
10.00	total xylenes													
TYPE OF DATa: ****** SEMIVOLATILES		**********												
DILUTION FACTOR:		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	52.0	47.0	44.0

DET. LIMIT CRQL (*=IDL)	SAMPLE NUMBER: UNITS:	CJP21 ug/l	CJP22 ug/l	CJP23 ug/l	CJP24 ug/l	CJP25 ug/l	CJP26 ug/l	CJP27 ug/l	CJP28 ug/l	CJP29 ug/l	CJP30 ug/l	CJP38 ug/kg	CJP52 ug/kg	CJP53 ug/kg
10.00	4-methylphenol													
10.00	2-methylnaphthalene													
10.00	acenaphthylene													
50.00	acenaphthene													
10.00	diethylphthalate	1.00 B												
10.00	fluorene													
50.00	pentachlorophenol													
10.00	phenanthrene												88.00 K	190.00J
10.00	anthracene													
10.00	di-n-butylphthalate	1.00 B		1.00 B		1.00 B								
10.00	fluoranthene											83.00J	87.00J@	320.00J
10.00	pyrene											130.00J	65.00J@	490.00
10.00	butylbenzylphthalate													
10.00	carbazole													
10.00	benzo(a)anthracene												110.00 K	160.00J
10.00	chrysene												210.00 K	170.00J
10.00	bis(2-ethylhexyl)phthalate				2.00 B					3.00 B		88.00 B	1800.00 R	150.00B@
10.00	benzo(b)fluoranthene												71.00J@	370.00 J
10.00	benzo(a)pyrene													
10.00	indeno(1,2,3-cd)pyrene													
10.00	dibenz(a,h)anthracene													
10.00	benzo(g,h,i)perylene													

SITE NAME: INACTIVE LANDFILL SAMPLING DATE(s): 12/05/91 STATE/COUNTY CODE:
TDD NUMBER: F3-3263-05 CASE NUMBER:17514 EPA NUMBER:
LAB NAMES: ORGANIC: COMPUCHEM, RTP INORGANIC: ITAS, PITTSBURGH

SAMPLE NUMBER:	CJP21	CJP22	CJP23	CJP24	CJP25	CJP26	CJP27	CJP28	CJP29	CJP30	CJP38	CJP52	CJP53
SAMPLE ID:	PW-1	HW-1		SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW-7	SD-1	SD-2	SD-3
LOCATION:	SBMWW MUNICIPAL SUPPLY WELL No.5 9TH ST.	FAITH BAPTIST CHURCH NORTH MAIN STREET		110' ENE OF BRICK BLDG. NORTH AREA INTERM. STR.	AT DISCHARGE PT. OF 18"-DIA. PIPE SOUTH OF LANDF	100' DOWN STREAM OF SW-2 IN INTERM. STEAM	100'UPSTREAM FROM SBMWW MUN. SUPPLY WELL NO. 5	100'DNSTREAM OF RTE.309 IN PERINNIAL STREAM	200'DNSTREAM FROM LOCATION SW-5	dup SW-2	SAME AS SW-1 LOCATIO	alongside rusted discharge pipe	SAME AS SW-3 LOCATION.
PH:	7.5	7.2		7.0	7.0	7.1	7.1	7.1	7.1	6.9	7.2	7.2	7.4
FIELD MEASUREMENTS:	NONE	NONE		NONE	NONE	NONE	NONE	NONE	NONE	NONR	NONE	NONE	NONE
PERCENT SOLIDS:											64.0%	70.0%	74.0%
TYPE OF DATA: ****** PESTICIDES	**********												
DILUTION FACTOR:	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1000.0	52.0	47.0	44.0

DET. LIMIT CRQL (*=IDL)	SAMPLE NUMBER: / UNITS:	CJP21 ug/l	CJP22 ug/l	CJP23 ug/l	CJP24 ug/l	CJP25 ug/l	CJP26 ug/l	CJP27 ug/l	CJP28 ug/l	CJP29 ug/l	CJP30 ng/l	CJP38 ug/kg	CJP52 ug/kg	CJP53 ug/kg
0.05	beta-BHC													
0.05	delta-BHC											0.64 B	0.52 B	0.46 B
0.05	heptachlor											0.61 B	0.25 B	0.20 B
0.05	aldrin													
0.05	heptachlor epoxide													
0.05	endosulfan I											1.40 B		
0.10	dieldrin													
0.10	4,4'-DDE											0.39 B		
0.10	endrin													
0.10	endosulfan II												5.40 B	1.30 B
0.10	4,4'-DDD											7.20 B		0.66 B
0.10	endosulfan sulfate													
0.10	4,4'-DDT												0.81 B	
0.50	methoxychlor										9.00 B			
0.10	endrin ketone													
0.05	alpha chlordane													
0.05	gamma chlordane													
0.10	endrin aldehyde											2.20 B		
1.00	aroclor-1254													

Comments: **********

FOR MCJP27, ZINC IDL=2 ug/l @=result reported from re-analysis
D=result rep'd from diluted re-analysis

SELECTED SAMPLE ORDER

SITE NAME: INACTIVE LANDFILL SAMPLING DATE(s): 12/05/91 STATE/COUNTY CODE:
IDD NUMBER: F3- CASE NUMBER:17514 EPA NUMBER:
LAB NAMES: ORGANIC: COMPUCHEM, RTP INORGANIC: ITAS, PITTSBURGH

SAMPLE NUMBER:	MCJP20	MCJP21		MCJP23	MCJP24	MCJP25	MCJP26	MCJP27	MCJP28	MCJP29	MCJP30
SAMPLE ID:	FW-1	MW-1		SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW-7	AQ BLNK.
LOCATION:	SBMWW MUN. SUPPLY WELL NO. 5 5TH STREET	FAITH BAPT CHURCH NORTH MAIN STREET	Ex-6	110' ENE OF BRICK BLDG. IN NORTH ARE A OF SITE	AT DISCHARGE PT.18"-PIPE INTERM. STR. DUP SW-7	100'DNSTREAM FROM LOCATIN SW-2	100'UPSTREAM FROM SBMWW MUN. SUPPLY WELL NO. 5	100'DNSTREAM FROM RTE.309 IN PERENNIAL STREAM	200'DNSTREAM FROM LOCATIN SW-5	AT DISCHARGE PT.18" PIPE INTERM. STR. DUP SW-2	DA SAMPLE
PH:	7.5	7.2		7.0	6.9	7.1	7.1	7.1	7.1	6.9	5.8
FIELD MEASUREMENTS:	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
PERCENT SOLIDS:											

TYPE OF DATA: ****** INORGANICS **********

DILUTION FACTOR:											
: GFAA	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
: ICP	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
: HG	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
: CN	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

DET. LIMIT SAMPLE NUMBER:		MCJP20	MCJP21	MCJP22	MCJP23	MCJP24	MCJP25	MCJP26	MCJP27	MCJP28	MCJP29	MCJP30
CRDL (*=IDL) UNITS:		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
* 200.00	aluminum				304.00	531.00	261.00	174.00	422.00	190.00	525.00	
* 2.00	arsenic	16.60	3.00	3.00		2.00			2.00			
* 1.00	barium	55.30	135.00	149.00	42.50	60.70	57.20	39.80	37.80	35.00	58.60	
* 8.00	calcium	90700.00	50100.00	52300.00	28000.00	34300.00	37500.00	26700.00	23200.00	24600.00	35000.00	66.40
* 3.00	copper		7.90	39.50	5.70	47.40	15.40	7.40	51.90	6.40	42.70	
* 15.00	iron	111.00 B	17.30 B	127.00 B	464.00	1970.00	844.00	330.00	579.00	162.00 B	1700.00	
* 1.00	lead (anal. by GFAA)			2.00	2.10	6.70	1.70	1.70	5.40	1.10	5.80	
* 15.00	magnesium	23200.00	18600.00	18200.00	9620.00	11900.00	13400.00	9230.00	8200.00	8260.00	12200.00	
* 1.00	manganese	14.50		2.10	561.00	666.00	396.00	45.70	36.20	8.20	590.00	
* 8.00	nickel					7.40						
* 512.00	potassium	1190.00	1190.00	1220.00	2640.00	2690.00	2830.00	2590.00	2380.00	2130.00	2830.00	
* 15.00	sodium	15600.00	11400.00	22700.00	11400.00	13400.00	15300.00	17700.00	17800.00	18000.00	13700.00	23.50
* 4.00	vanadium					10.20	5.80				10.40	
* 2.00	zinc	12.60 B	63.20 B	137.00 K	20.40 B	180.00	150.00 J	33.20 B	57.50 B	15.80 B	171.00	5.90

Comments: **********
FOR MCJP27, ZINC IDL=2 ug/l

SITE NAME: INACTIVE LANDFILL SAMPLING DATE(s): 12/05/91 STATE/COUNTY CODE:
TDD NUMBER: F3-3263-05 CASE NUMBER:17514 EPA NUMBER:
LAB NAMES: ORGANIC: COMPUCHEM, RTP INORGANIC: ITAS, PITTSBURGH

	SAMPLE NUMBER:	CJP54	CJP55	CJP56	CJP57	CJP58	CJP59	CJP60	CJP61	CJP62	CJP63	CJP64	CJP65	CJP66
	SAMPLE ID:	SD-4	SD-5	SD-6	SD-7	S-1	S-2	S-3	S-4	SS-1	SS-2	SS-3	TRP. BLNK.	AQ BLNK.
	LOCATION:	SAME AS SW-4 LOCATION	SAME AS SW-5 LOCATION	SAME AS SW-6 LOCATION	12th St.culvert;drain ditch,N side of site	BELOW 6-IN. DIA. PIPE SE OF BRICK BLDG IN INTS	IN CENTER OF LANDFILL AREA 4 FT. NORTH OF SS2	BACKGROUND ON WOODED HILL IN EAST SIDE OF SITE	dup of SD-2	IN THE CENTRAL PORTION OF THE LANDFILL AREA	15 FT. WEST OF INT. STRAM IN LANDFILL AREA	SOUTHEAST SIDE OF LANDFILL AREA	QA SAMPLE	QA SAMPLE
	PH:	7.4	7.5	6.1	7.4	7.2	7.3	6.8	6.9	7.0	7.3	6.9		5.8
	FIELD MEASUREMENTS:	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	1000 PPM	NONE	NONE	NONE	NONE
	PERCENT SOLIDS:	76.0%	77.0%	63.0%	70.0%	61.0%	78.0%	79.0%	71.0%	63.0%	68.0%	75.0%		
TYPE OF DATA: ******	VOLATILES	**********												
	DILUTION FACTOR:	1.3	1.3	1.6	1.4	1.6	1.3	1.3	1.4	1.6	1.5	1.3	1.0	1.0

DET. LIMIT CRQL (*=IDL)	SAMPLE NUMBER: / UNITS:	CJP54 ug/kg	CJP55 ug/kg	CJP56 ug/kg	CJP57 ug/kg	CJP58 ug/kg	CJP59 ug/kg	CJP60 ug/kg	CJP61 ug/kg	CJP62 ug/kg	CJP63 ug/kg	CJP64 ug/kg	CJP65 ug/l	CJP66 ug/l
10.00	vinyl chloride													
10.00	methylene chloride	48.00 B	34.00 B	59.00 B	44.00 B	53.00 B	65.00 B	73.00 B	40.00 B	52.00 B	81.00 B	41.00 B	28.00	23.00
10.00	acetone						880.00RD	24.00 B		90.00 B	54.00B@	37.00 B		22.00
10.00	1,1-dichloroethane						28.00		6.00J	10.00J				
10.00	1,2-dichloroethene(total)								34.00	15.00J				
10.00	chloroform												2.00J	
5.00	1,1,1-trichloroethane													
10.00	trichloroethene										11.00J@	7.00J		
10.00	benzene									5.00J				
10.00	tetrachloroethene						4.00J			19.00	11.00J@	46.00		
10.00	toluene						44.00			100000.00 D				
10.00	ethylbenzene						12.00J			28000.00 D				
10.00	total xylenes						500.00 J			190000.00 D				
TYPE OF DATa: ******	SEMIVOLATILES	**********												
	DILUTION FACTOR:	220.0	210.0	52.0	93.0	270.0	1100.0	41.0	46.0	1000.0	720.0	870.0	0.0	1.0

DET. LIMIT CRQL (*=IDL)	SAMPLE NUMBER: / UNITS:	CJP54 ug/kg	CJP55 ug/kg	CJP56 ug/kg	CJP57 ug/kg	CJP58 ug/kg	CJP59 ug/kg	CJP60 ug/kg	CJP61 ug/kg	CJP62 ug/kg	CJP63 ug/kg	CJP64 ug/kg	CJP65 n/a	CJP66 ug/l
10.00	4-methylphenol									17000.00				
10.00	2-methylnaphthalene						1200.00J			1100.00J				
10.00	acenaphthylene			72.00J										
50.00	acenaphthene	250.00J			120.00J@									
10.00	diethylphthalate						3300.00B@							
10.00	fluorene	630.00J		55.00J@	210.00J@					1400.00 J				
50.00	pentachlorophenol		66.00L@		170.00 L									
10.00	phenanthrene	6200.00	1300.00J	710.00 @	3800.00 @	410.00J	2000.00 @	66.00J	77.00J	3000.00 J				
10.00	anthracene	2100.00J	260.00J	99.00J@	350.00J@									
10.00	di-n-butylphthalate								59.00B@	7500.00 B				
10.00	fluoranthene	11000.00	2400.00	1900.00 @	7600.00 @	1000.00J		130.00J	130.00J	1400.00J		1500.00J		
10.00	pyrene	8700.00	2200.00	1100.00 @	3500.00 @	1100.00J		96.00J	86.00J	1900.00J				
10.00	butylbenzylphthalate				100.00B@									
10.00	carbazole			62.00J@	340.00J@									
10.00	benzo(a)anthracene	5200.00	1200.00J	740.00 @	3000.00 @	590.00J		56.00J		1300.00J				
10.00	chrysene	4600.00	1300.00J	890.00 @	2900.00 @	540.00J	3300.00J@	61.00J	59.00J	1300.00J				
10.00	bis(2-ethylhexyl)phthalate		230.00 B	240.00B@	390.00B@	770.00 B	4700.00 B		250.00 B	63000.00		9700.00 B		
10.00	benzo(b)fluoranthene	8000.00	2800.00	2200.00 @	10000.00	1200.00 J		90.00 J						
10.00	benzo(a)pyrene	3100.00	940.00J	620.00 @	1100.00 @	400.00J								
10.00	indeno(1,2,3-cd)pyrene	1400.00J	570.00J	1100.00 @	730.00J@									
10.00	dibenz(a,h)anthracene	450.00J	120.00L@	350.00J@										
10.00	benzo(g,h,i)perylene	910.00J	490.00J	840.00 @										

SITE NAME: INACTIVE LANDFILL SAMPLING DATE(s): 12/05/91 STATE/COUNTY CODE:
TDD NUMBER: F3-3263-05 CASE NUMBER:17514 EPA NUMBER:
LAB NAMES: ORGANIC: COMPUCHEM, RTP INORGANIC: ITAS, PITTSBURGH

SAMPLE NUMBER:	CJP54	CJP55	CJP56	CJP57	CJP58	CJP59	CJP60	CJP61	CJP62	CJP63	CJP64	CJP65	CJP66
SAMPLE ID:	SD-4	SD-5	SD-6	SD-7	S-1	S-2	S-3	S-4	SS-1	SS-2	SS-3	TRP. BLNK.	AQ BLNK.
LOCATION:	SAME AS SW-4 LOCATION	SAME AS SW-5 LOCATION	SAME AS SW-6 LOCATION	12th St.culvert;drain ditch,N side of site	BELOW 6-IN. DIA. PIPE SE OF BRICK BLDG IN INTS	IN CENTER OF LANDFILL AREA 4 FT. NORTH OF SS2	BACKGROUND ON WOODED HILL IN EAST SIDE OF SITE	dup of SD-2	IN THE CENTRAL PORTION OF THE LANDFILL AREA	15 FT. WEST OF INT. STREAM IN LANDFILL AREA	SOUTHEAST SIDE OF LANDFILL AREA	QA SAMPLE	QA SAMPLE
PH:	7.4	7.5	6.1	7.4	7.2	7.3	6.8	6.9	7.0	7.3	6.9		5.8
FIELD MEASUREMENTS:	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	1000 PPM	NONE	NONE	NONE	NONE
PERCENT SOLIDS:	76.0%	77.0%	63.0%	70.0%	61.0%	78.0%	79.0%	71.0%	63.0%	68.0%	75.0%		
TYPE OF DATA: ****** PESTICIDES **********													
DILUTION FACTOR:	43.0	43.0	52.0	47.0	54.0	42.0	41.0	46.0	2600.0	48.0	44.0		1.0

DET. LIMIT CRQL (*=IDL)	SAMPLE NUMBER: CJP54	CJP55	CJP56	CJP57	CJP58	CJP59	CJP60	CJP61	CJP62	CJP63	CJP64	CJP65	CJP66
	UNITS: ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	n/a	ug/l
0.05 beta-BHC						17.00 R			110.00 R				
0.05 delta-BHC	0.36 B	3.20 R	2.80 B	5.00 R	1.10 B	1.30 B					0.27 B		
0.05 heptachlor			0.27 B										
0.05 aldrin	0.28 R	0.26 R							130.00 R				
0.05 heptachlor epoxide	0.73 B	0.85 B	1.00 B	1.20 B	0.44 B	10.00 R			130.00 R	1.50 B			
0.05 endosulfan I						4.00 R	1.50 R			1.20 B			
0.10 dieldrin					0.80 B				37.00 B				
0.10 4,4'-DDE	0.42 B		0.25 B	0.95 B		0.48 B			31.00 B	8.70 R			
0.10 endrin		2.10 B	1.80 B			7.40 R							
0.10 endosulfan II		0.42 B	0.55 B	3.70 B						16.00 B			
0.10 4,4'-DDD		1.50 B				19.00 R				2.50 B			
0.10 endosulfan sulfate									200.00 R	1.50 R			
0.10 4,4'-DDT	0.43 B	1.40 B		2.90 B		7.80 B			230.00 B	4.40 B			
0.50 methoxychlor						1.40 B			130.00 B		46.00 R		
0.10 endrin ketone			4.90 R	0.72 B		26.00 R	1.00 B						
0.05 alpha chlordane				3.40 R									
0.05 gamma chlordane	0.21 R	0.14 R	0.43 R	0.69 R	1.20 R	2.80 R			69.00 R	0.51 R			
0.10 endrin aldehyde	1.10 B	3.80 B	2.20 B	23.00 R	0.93 B	21.00 R			190.00 B	4.00 B			
1.00 aroclor-1254											6200.00		

Comments: **********

FOR MCJP27, ZINC IDL=2 ug/l @=result reported from re-analysis
D=result rep'd from diluted re-analysis

SELE... SAMPLE ORDER

SITE NAME: INACTIVE LANDFILL | SAMPLING DATE(s): 12/05/91 | STATE/COUNTY CODE:
TDD NUMBER: F3-3263-05 | CASE NUMBER:17514 | EPA NUMBER:
LAB NAMES: ORGANIC: COMPUCHEM, RTP INORGANIC: ITAS, PITTSBURGH

SAMPLE NUMBER:	MCJP30	MCJP38	MCJP51	MCJP52	MCJP53	MCJP61	MCJP62	MCJP63	MCJP64	MCJP65	MCJP66	MCJP67	MCJP68
SAMPLE ID:	Sd-1	Sd-5	Sd-2	Sd-3	Sd-4	Sd-6	Sd-7	S-1	S-2	S-3	S-4	SS-1	SS-2
LOCATION:	SAME AS LOCATION SW-1	SAME AS LOCATION SW-5	alongside rusted discharge pipe	SAME AS LOCATION SW-3	SAME AS LOCATION SW-4	SAME AS LOCATION SW-6	12th St.culvert,drain ditch,N side of site	FROM BELOW OUTFALL PIPE NEAR BRICK BLDG. INT.ST	IN THE CENTRAL PORTION OF LANDFILL AREA	BACKGROUND SAMPLE UP GRADIENT OF LANDFILL	dup of SD-2	IN THE CENTRAL PORTION OF THE LAND FILL AREA	15 FEET WEST OF INTERM. STREAM IN THE LANDFILL
PH:													
FIELD MEASUREMENTS:	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	OVA: 1000PPM	NONE
PERCENT SOLIDS:	61.0%	72.1%	67.6%	68.3%	71.6%	60.7%	85.7%	61.1%	77.3%	76.8%	64.9%	64.2%	70.2%
TYPE OF DATA: ****** INORGANICS	**********												
DILUTION FACTOR: : GFAA	0.320	0.270	0.290	0.290	0.270	0.310	0.230	0.310	0.250	0.260	0.300	0.300	0.270
: ICP	0.310	0.270	0.280	0.290	0.270	0.310	0.220	0.320	0.250	0.260	0.290	0.300	0.300
: Hg	0.780	0.630	0.740	0.670	0.580	0.820	0.560	0.820	0.590	0.620	0.700	0.710	0.710
: CN	0.082	0.069	0.074	0.073	0.070	0.082	0.058	0.082	0.064	0.065	0.077	0.078	0.071

DET. LIMIT	SAMPLE NUMBER:	MCJP30	MCJP38	MCJP51	MCJP52	MCJP53	MCJP61	MCJP62	MCJP63	MCJP64	MCJP65	MCJP66	MCJP67	MCJP68
CRQL (*=IDL)	UNITS:	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
* 11.00	aluminum	8560.00	24300.00	14300.00	13300.00	11200.00	16600.00	11200.00	13300.00	15400.00	20600.00	11000.00	10500.00	10800.00
* 7.00	antimony	9.70 B	46.80 R	53.70 R	31.90 R	22.90 B	22.40 B	30.30 R	21.60 B	165.00 J	26.80 R	34.20 R	159.00 J	50.70 J
* 2.00	arsenic	3.20 J	9.40 J	7.50 J	5.70 J	9.80 J	8.50 J	4.80 J	5.30	7.60	3.60	1.50 J	8.90	4.40
* 1.00	barium	84.10	105.00	150.00	88.30	52.40	103.00	103.00	98.10	131.00	76.80	126.00	311.00	77.80
* 1.00	beryllium	0.63	1.90	1.30	1.20	0.81	1.00	1.00	0.92	1.20	1.10	1.30	3.10	0.62
* 2.00	cadmium									28.40 J			31.90 J	3.50 J
* 6.00	calcium	1380.00 J	3440.00 J	1400.00 J	1500.00 J	1150.00 J	2720.00 J	17800.00 J	2600.00 J	10800.00 J	744.00 J	1390.00 J	8110.00 J	5260.00 J
* 6.00	chromium	12.70 K	51.70	30.90	28.50	19.80	31.10	37.80	24.50 J	253.00 J	25.50 J	22.90	846.00 J	177.00 J
* 3.00	cobalt	6.30	21.70	20.30	17.70	11.70	11.20	11.90	11.10	18.10	14.60	22.90	40.80	7.60
* 3.00	copper	14.60 J	173.00 J	4530.00 J	305.00 J	23.80 J	38.90 J	52.20 J	45.40	130000.00	11.40	611.00 J	67100.00	28300.00
* 4.00	iron	11300.00	37300.00	47500.00	27900.00	19100.00	20400.00	23900.00	16700.00 J	13500.00 J	24100.00 J	31000.00	43000.00 J	17100.00 J
* 1.00	lead (anal. by GFAA)	40.40	46.60		51.70	35.40	70.40		81.40		29.60			
* 26.00	lead (anal. by ICP)			201.00				146.00		6560.00		118.00	3180.00	330.00
* 11.00	magnesium	3050.00 J	17800.00 J	8560.00 J	9160.00 J	6790.00 J	7000.00 J	11000.00 J	5130.00 J	10800.00 J	7580.00 J	3920.00 J	3780.00 J	2810.00 J
* 1.00	manganese	929.00	1140.00	3140.00	1610.00	573.00	583.00	679.00	957.00	373.00	881.00	3010.00	560.00	223.00
* 0.20	mercury	0.20	0.16	0.21	0.28	0.15	0.26	0.19	0.61 J	5.40 J		0.22	13.90 J	60.50 J
* 17.00	nickel	11.20	41.30	95.70	35.10	21.10	23.30	28.70	20.70 J	550.00 J	26.80 J	56.00 J	199.00 J	33.00 J
* 61.00	potassium	420.00	1510.00	444.00	651.00	845.00	1550.00	1820.00	1100.00 J	1220.00 J	754.00 J	383.00	516.00 J	965.00 J
* 2.00	selenium									0.51 L			0.61 L	
* 2.00	silver		0.84	1.70						41.80 J		0.78	20.50 J	4.80 J
* 9.00	sodium	111.00	177.00	97.50	102.00	107.00	193.00	277.00	183.00	229.00	75.60	99.10	267.00	161.00
* 1.00	thallium	0.32 B	0.27 B	0.29 B		0.27 B	0.31 B	0.23 B	0.31 B	0.51 B	0.51 B	0.30 B	1.20 B	0.27 B
* 2.00	vanadium	21.20	77.20	51.80	91.50	35.60	43.80	51.00	40.30	36.50	40.50	51.80	38.50	55.60
* 1.00	zinc	48.60 J	167.00 J	1300.00 J	425.00 J	86.00 J	130.00 J	201.00 J	197.00	3500.00	108.00	660.00 J	42800.00	10500.00
* 4.00	cyanide			0.37	0.37	0.28	0.41						4.90	1.10

Comments: **********

FOR MCJP27, ZINC IDL=2 ug/l @=result reported from re-analysis
D=result rep'd from diluted re-analysis

SELECTED SAMPLE ORDER

NAME: INACTIVE LANDFILL SAMPLING DATE(s): 12/05/91 STATE/COUN.. CODE:
NUMBER: F3-3263-05 CASE NUMBER:17514 EPA NUMBER:
NAMES: ORGANIC: COMPUCHEM, RTP INORGANIC: ITAS, PITTSBURGH

SAMPLE NUMBER: MCJP69
SAMPLE ID: SS-3
LOCATION: SOUTHEAST SIDE OF LANDFILL AREA
PH:
FIELD MEASUREMENTS: NONE
PERCENT SOLIDS: 71.5%

OF DATA: ****** INORGANICS **********

DILUTION FACTOR: : GFAA 0.280
: ICP 0.270
: Hg 0.670
: CN 0.070

LIMIT (*=IDL)		SAMPLE NUMBER:	MCJP69
		UNITS:	mg/kg
1.00	aluminum		13200.00
7.00	antimony		239.00 J
2.00	arsenic		13.20
1.00	barium		284.00
1.00	beryllium		4.30
2.00	cadmium		45.40 J
5.00	calcium		9080.00 J
5.00	chromium		1560.00 J
3.00	cobalt		28.30
3.00	copper		122000.00
4.00	iron		58600.00 J
1.00	lead (anal. by GFAA)		
6.00	lead (anal. by ICP)		6240.00
1.00	magnesium		7210.00 J
1.00	manganese		544.00
0.20	mercury		21.20 J
7.00	nickel		776.00 J
1.00	potassium		935.00 J
2.00	selenium		1.70
2.00	silver		30.10 J
9.00	sodium		361.00
8.00	thallium		0.28 B
2.00	vanadium		507.00
1.00	zinc		66900.00
4.00	cyanide		10.50

Comments: **********

FOR MCJP27, ZINC IDL=2 ug/l @=result reported from re-analysis
D=result rep'd from diluted re-analysis

7.2 QUALITY ASSURANCE REVIEW

7.2.1 Organic Data Lab Case 17514

7.2.1.1 Summary

Fourteen solid samples and 11 aqueous samples were analyzed for volatile, acid, base-neutral, and pesticide/polychlorinated biphenyl (PCB) compounds through the EPA Contract Laboratory Program (CLP) according to the March 1990 low/medium organic Statement of Work (SOW). Included in the sample set were one field blank and one aqueous duplicate pair. One trip blank was also analyzed for volatile organic compounds.

The data have been fully reviewed to determine the usability of results according to the National and Regional guidelines. (Areas examined in detail are listed in the Support Documentation appendix.) Data quality was acceptable for nearly all compounds, as demonstrated by meeting criteria for spike and surrogate recoveries and instrument tuning and calibration. Blank contamination affected low levels of several compounds. There were several noteworthy quality control problems.

Principal areas of concern include blank contamination, several surrogate recoveries that were out of control, the deletion of several results from the data summary, and the evaluation of multiple results for several analyses.

7.2.1.2 Qualifiers

- Several results have been flagged as undetected due to blank contamination (B). The results for numerous compounds were not significantly higher than the levels detected for these compounds in all associated laboratory and field blanks. The table on the following page summarizes which results have been flagged (B):

Compound	Affected Results
methylene chloride	all results except CJP65 and CJP66
acetone	all results except CJP59 and CJP66
chloroform	all results except CJP65
toluene	CJP30
diethyl phthalate	CJP21
di-n-butyl phthalate	all results
bis(2-ethylhexyl) phthalate	all results except CJP52 and CJP62
butylbenzyl phthalate	CJP57
delta-BHC	all results except CJP55 and CJP57
heptachlor	all positive results
heptachlor epoxide	all results except CJP59 and CJP62
dieldrin	all positive results
DDE	all results except CJP63
endrin	all results except CJP59
endosulfan I	CJP63 and CJP38
endosulfan II	all results
DDD	all results except CJP59
DDT	all results
methoxychlor	all results except CJP64
endrin ketone	all results except CJP56 and CJP59
endrin aldehyde	all results except CJP57 and CJP59

- The volatile fraction of sample CJP59 was re-analyzed at a dilution because the result for total xylenes was slightly above the calibration range in the initial analysis. After evaluation of both analyses for this sample, the reviewer reported all results except for acetone from the initial, undiluted analysis, for the following reasons:

  1. Methylene chloride was questioned by the blanks in both analyses; the lowest result has been reported.

2. The results for 1,1-dichloroethane (1,1-DCEA), tetrachloroethene, toluene, and ethylbenzene were higher in the initial analysis. (Toluene, 1,1-DCEA, and ethyl benzene were below the calibration range in the diluted analysis, and tetrachloroethene was not detected in the diluted analysis.)

3. Total xylenes was reported from the initial analysis because the final result was based on two chromatographic peaks; the instrument level concentration of one peak was below the level of the highest calibration standard (200 ug/l), and the instrument level concentration of the second peak was only slightly higher than 200 ug/l. In addition, the initial result was 2.5 times higher than the diluted result. (Most of the initial results for the other compounds were approximately 2.5 times higher than the diluted results as well.) There was no evidence of detector saturation for total xylenes in the initial analysis, as demonstrated by sharp, well-resolved peaks. The result has been flagged as estimated (J) because of the imprecision between the diluted and undiluted results.

4. Acetone was reported from the diluted re-analysis because the instrument level result was slightly higher than the level considered attributable to blank contamination. However, the value was not high enough to be considered confident, and there was no corroboration for this compound (i.e., no other related ketones were detected). In addition, acetone was not detected in the initial undiluted analysis. Consequently, the result for this common laboratory contaminant has been flagged as unreliable (R), and further information would be necessary to determine if acetone is actually present at this sampling location.

- The volatile fraction of sample CJP63 was re-analyzed because the areas for the second and third internal standards (ISs) were slightly below the contractual limits in the initial analysis. The areas for these ISs were also slightly below contractual limits in the re-analysis; however, detection limit capability is not affected in either analysis of this sample. The reviewer reported the lowest results for methylene chloride, acetone, and toluene (not detected) because the results for these three compounds were questioned by the blanks in both analyses. The highest results have been reported for trichloroethene and tetrachloroethene from the re-analysis.

- Because of very high instrument levels for toluene, ethylbenzene, and total xylenes, the laboratory re-analyzed sample CJP62 according to the medium-level procedure. The results for these three compounds were 25 times higher in the re-analysis, which demonstrates the superior extraction capability of the methanol extraction procedure utilized for this method. Accordingly, results for toluene, ethylbenzene, and total xylenes were reported from the medium-level re-analysis. Results for methylene chloride and acetone were questioned by the blanks in both analyses; therefore, the lowest results for these common laboratory contaminants have been reported from the initial analysis. Results for 1,1-DCEA, 1,2-dichloroethene (1,2-DCE), benzene, and tetrachloroethene were all reported from the initial analysis because these compounds were not detected in the re-analysis. (These compounds were below the detection capability of the medium-level re-analysis.)

- The results for vinyl chloride are considered confident in samples CJP25, CJP26, and CJP30. Samples CJP25 and CJP30 are field duplicates; related chloroalkenes are present in all three samples; the sample mass spectra and retention times match those of the reference standards; and CJP26 represents a sampling location that is just downstream from the location represented by samples CJP25 and CJP30. The results are considered estimated, however, because of a high percent difference between the average initial calibration response factor and the continuing calibration response factor associated with these three samples. Consequently, the results for vinyl chloride have been flagged (J) in all three samples.

Samples CJP52 through CJP58 and CJP60

The reviewer has deleted the results for benzo(k)fluoranthene from the data summary for all these samples. In each sample, the peak identified as both benzo(b)fluoranthene and benzo(k)fluoranthene eluted at the expected retention time for benzo(b)fluoranthene. There was no evidence for the presence of the benzo(k) isomer in any sample, with the possible exception of sample CJP60 [even in this sample, the concentration of this isomer was much lower than the concentration of the benzo(b) isomer]. The laboratory software identified both isomers, and the laboratory personnel reported equal concentrations for both isomers, even after obtaining a mass-selective chromatogram that indicated that benzo(b)fluoranthene was the primary isomer present in all these samples.

- Nearly every solid sample was re-analyzed for the semivolatile fraction. In all cases, several surrogate recoveries were out of quality control limits. In three samples (CJP52, CJP53, and CJP59), the areas for the sixth IS were slightly below quality control (QC) limits, although not low enough to affect detection limit capability.

- The reviewer has evaluated each initial analysis/re-analysis group and reported the results considered the most confident. The following paragraphs deal with each analysis pair individually; the Support Documentation appendix includes copies of reporting forms for each set of analyses, with notations regarding which results have been reported.

  Sample CJP52

  The recovery for the terphenyl surrogate was above control limits in the initial analysis and within control limits in the re-analysis. Consequently, for fluoranthene and pyrene, which were detected in both analyses, the results from the re-analysis have been reported because of better surrogate performance for terphenyl. (The results were substantially higher for these compounds in the initial analysis, and, if this analysis had been the only one reported, the results for fluoranthene and pyrene would have been considered biased high.) Phenanthrene, benz(a)anthracene, and chrysene were detected only in the initial analysis. Therefore, these results have been reported and flagged as biased high (K). Bis(2-ethylhexyl) phthalate (DEHP) was detected in both analyses, and the instrument level was above the range considered attributable to blank contamination only in the initial analysis. Consequently, the initial result has been reported and has been flagged as unreliable (R) because the value was not much higher than the blank range. Further information would be necessary to determine if this common laboratory contaminant is actually present at this sampling location.

- Detection limits for substituted phenolic compounds may be higher than reported for this sample. The recoveries for at least two substituted acid surrogates were low in both analyses of this sample.

Sample CJP53

Because the terphenyl surrogate recoveries were acceptable in both analyses, the reviewer has reported the highest levels of all polynuclear aromatic hydrocarbons (PAHs) detected in either analysis. The lowest level for DEHP has been reported, because results in both analyses are questioned by the blanks.

- Detection limits for substituted phenolic compounds may be higher than reported for this sample. The recoveries for 2-fluorophenol and tribromophenol were low in both analyses of this sample.

Sample CJP55

This sample was initially analyzed at a five-times dilution because of matrix effects identified through the screening procedure. The laboratory then re-analyzed the sample with no dilution. The surrogate recoveries for the base-neutral compounds were more than two times higher in the diluted analysis, especially for terphenyl. In addition the results for all PAHs were higher in the diluted re-analysis, indicating that the dilution minimized the matrix effects to a significant extent. Consequently, results for all compounds detected in both analyses have been reported from the initial, diluted analysis. Pentachlorophenol and dibenz(a,h)anthracene were detected only in, and reported from, the undiluted re-analysis. DEHP was reported from the undiluted re-analysis; the results in both analyses were questioned by the blanks, and the lower result has been reported.

- The results for pentachlorophenol and dibenz(a,h)anthracene have been flagged as biased low (L) because of poor performance for the terphenyl and the tribromophenol surrogates in the undiluted re-analysis. In addition, detection limits may be substantially higher than reported for all acid-extractable compounds because of poor performance of all other acid surrogates in both analyses.

Sample CJP56

As with the preceding sample, the initial analysis was performed at a five-times dilution. The laboratory than re-analyzed the sample with no dilution because the data from the diluted analysis were relatively free from interferences. Because base-neutral surrogate recoveries were comparable for both analyses, the reviewer reported the highest results that were within calibration range for each compound (above the quantitation limit for the respective analysis), except for phthalate blank contaminants. For compounds that were detected only in the undiluted re-analysis, these results have been reported. Because results for butylbenzyl phthalate and DEHP were questioned by the blanks in both analyses, the lowest results (from the re-analysis) have been reported.

- Detection limits for substituted phenolic compounds (especially multi-halogenated phenols such as trichlorophenol and pentachlorophenol) may be higher than reported because of poor surrogate performance for the tribromophenol surrogate in the diluted analysis, whereas detection limits may be biased low for all phenolic compounds in the undiluted analysis.

Sample CJP57

The initial analysis of this sample was analyzed at a five-times dilution; the re-analysis was analyzed at a two-times dilution. Base-neutral surrogate performance was generally similar, and acid surrogate recoveries were uniformly very low. Because all results for non-phthalate compounds were higher in the re-analysis, these values were reported on the data summary. Because all results for butylbenzyl phthalate and DEHP were questioned by the blanks, the lowest values for both compounds have been reported from the re-analysis.

- The reviewer deleted the result for benzo(g,h,i)perylene from the data summary. The mass spectra in both analyses did not exhibit acceptable matches with the reference standards. Many of the characteristic ions were not present, and the intensities of the few ions that may be characteristic of this PAH were no higher than the background noise level in both analyses.

- Detection limits for all acid-extractable compounds may be much higher than reported in this sample. Acid surrogate recoveries were very low (at or near zero percent) in both analyses.

Sample CJP59

The initial extract of this sample was re-injected because of a high recovery for the 2-fluorobiphenyl surrogate and a very high recovery for the terphenyl surrogate. The re-injection exhibited good recoveries for both these surrogates, even at a 25-times dilution. The reviewer reported 2-methylnaphthalene from the initial analysis because this compound was not detected in the re-analysis. The result for diethyl phthalate was reported from the initial analysis because the instrument level result was substantially higher than the range considered attributable to blank contamination. Both phenanthrene and chrysene have been reported from the re-injection because the results were somewhat lower, and the surrogate information suggests that these results may be more reliable. (If the results from the initial analysis were reported, the values would be considered biased quite high because of the very high terphenyl surrogate recovery.) The lowest results for diethyl phthalate, di-n-butyl phthalate, and DEHP have been reported; both results for these common laboratory contaminants were questioned by the blanks.

Sample CJP60

Both analyses of this sample were performed with no dilution, and the terphenyl surrogate performed satisfactorily in both analyses. All results were higher in the initial analysis and were reported from this analysis. The reviewer corrected the result reported for benzo(b)fluoranthene on the data summary, based upon a recalculation of the peak area considered attributable to this isomer.

- The detection limits for highly halogenated phenolic compounds, such as pentachlorophenol, may be higher than reported in this sample. The tribromophenol surrogate recoveries were low in both analyses of this sample.

Sample CJP61

Both analyses of this sample were performed at no dilution. The base-neutral surrogate recoveries were acceptable in both analyses. Consequently, the highest results were reported for all compounds except the phthalates, which were questioned by the blanks in both analyses. All results except di-n-butyl phthalate were reported from the initial analysis.

- The detection limits for highly halogenated phenols, such as pentachlorophenol, may be higher than reported in this sample. The recoveries for the tribromophenol surrogate were very low in both analyses of sample CJP61.

- The laboratory reported a value of 2,600 ug/kg for both benz(a)anthracene and chrysene in sample CJP62. The laboratory software identified both compounds (structural isomers) from one chromatographic peak, which eluted midway between the expected retention times of both isomers. The software (and laboratory personnel) attributed the entire area of this single peak to both compounds. However, the reviewer attributed one-half of the total peak area to each isomer and reported one-half the value (1,300 ug/kg) for each compound. Based on the available information, it is not possible to determine which isomer is actually present, because both compounds exhibit the same mass spectra.

- The result for DEHP in sample CJP52 has been flagged as unreliable (R). The instrument level result was only slightly higher than the level considered attributable to blank contamination. Further information would be necessary to determine if this result should be considered reliable.

- The result reported for Aroclor 1254 is considered confident in sample CJP64. Nearly all the characteristic peaks were present on both columns, and the peaks in the sample matched well with the standard in terms of retention time and area ratio matching quality. This result could not be confirmed by gas chromatography/mass spectrometry (GC/MS), as attempted by the laboratory, because the semivolatile analysis was conducted at a dilution factor of 20 and the instrument level for this PCB was below the detection capability of this analysis.

- All pesticide results that have not been flagged (B) have been flagged as unreliable (R) on the data summary. Large matrix interferences were visible on both columns for nearly every solid sample. In some cases, these interferences were much larger than the peaks representing the surrogate compounds. This was especially noticeable for samples CJP54 through CJP57, CJP59, and CJP62. These interferences, eluting within the expected retention time windows of target compounds, can result in false positive results, such as were reported in this case. (A comparison of results from both columns for all solid samples indicates significant differences in results for most of the low-level pesticide compounds that were reported, further suggesting that these results are interference related.) Detection limits for most non-reported pesticide/PCB compounds may be higher than reported in these samples. Because there is no previous evidence of any site-related pesticide compounds, the values reported on the data summary that have been flagged (R) require substantially more information to determine if any of these results represent indigenous compounds and are not the results of co-eluting interferences.

- The units for the pesticide/PCB analysis for sample CJP30 have been entered as "ng/l" (nanograms/liter), and the dilution factor has been listed as 1,000. This has been done because the laboratory reported a result that was too low to be entered on the data summary. Consequently, the units and dilution factor have been adjusted in order that all significant figures could be entered for this result. This sample was not diluted 1,000 times.

- Sample results below the range of accurate quantitation have been flagged as estimated (J) on the data summary where no other flag exists.

- Tentatively identified compounds (TICs) that are not considered to be laboratory artifacts are summarized immediately following this report.

7.2.1.3 Support Data

The Support Documentation appendix to this report documents the above findings associated with blank contamination, low surrogate recoveries, the deletion of several results from the data summary, and the evaluation of multiple analyses for several samples. (Issues pertaining to laboratory contractual compliance are found on a separate summary directed to the laboratory technical project officer.)

Report prepared by Roy Cohen
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Report reviewed by Russell Sloboda
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(Jde 17514

SAMPLE DATA SUMMARY: ORGANIC TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NUMBER	ANALYSIS FRACTION (VOA/BNA)	ESTIMATED CONCENTRATION VALUE	ESTIMATED CONCENTRATION UNITS	QUALIFIER CODE	COMPOUND NAME
CJP21	VOA				ND
	BNA	3	ug/l	unk	unsatd HC of unknown subst.
CJP22	VOA				ND
	BNA				ND
CJP23	VOA				ND
	BNA				ND
CJP24	VOA				ND
	BNA				ND
CJP25	VOA				ND
↓	BNA	6	ug/l	unk	unsat'd HC of unknown subst.
↓	"	3	ug/l		Carboxylic acid
CJP26	VOA				ND
"	BNA	5	ug/l		Carboxylic acid
CJP27	VOA				ND
"	BNA	4	ug/l		Carboxylic acid
CJP28	VOA				ND
"	BNA				ND
CJP29	VOA				ND
"	BNA	5	ug/l		Carboxylic acid

DEFINITIONS OF QUALIFIER CODES:

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UNK = UNKNOWN COMPOUND: Library search result unreasonable or of very low matching quality.

TOT = TOTAL CONCENTRATION REPORTED: Represents the sum of several compounds detected all belonging to the same chemical class.

ISO = OR ISOMER: Compound identification is not selective for this isomer only. This result may instead represent the presence of a similar compound comprised of the same atoms bonded together in a different arrangement or substitution pattern.

SAT HC = SATURATED HYDROCARBON
UNSAT HC = UNSATURATED HYDROCABON
HC = HYDROCARBON
PAH - polynuclear aromatic hydrocarbon
SUB = SUBSTITUTED
MIX = MIXTURE OF 2 OR MORE COELUTANTS
ND = NONE DETECTED

CLP 17.514

SAMPLE DATA SUMMARY: ORGANIC TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NUMBER	ANALYSIS FRACTION (VOA/BNA)	ESTIMATED CONCENTRATION VALUE	UNITS	QUALIFIER CODE	COMPOUND NAME
CJP30	VOA				ND
	BNA				ND
CJP38	VOA				ND
	BNA	2040	ug/kg	TOT	Sat'd HC (5)
		2300		TOT	Carboxylic acid (3)
		210			aliphatic alcohol
		1400		TOT/UNK	unknowns (2)
CJP52	VOA				ND
	BNA	4500	ug/kg	TOT	Sat'd HC (5)
		2900		TOT	carboxylic acid (2)
		280			homandrostanone
		1500			pregnane
		470			phytol ($C_{20}H_{50}O$)
		1500			triterpane HC
		600		TOT/UNK	poss cyclic hydrocarbons (2)
		380			sterol derivative
		9,000		TOT/UNK	unknowns (10)
CJP53	VOA				ND
	BNA	450	ug/kg		Carboxylic acid
		1800		TOT	Sterol derivatives (3)
		310		ISO	$C_{17}H_{12}$ PAH, such as benz(a)fluorene
		540			triterpane HC
		3400		TOT/UNK	unknowns (9)

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UNSAT HC = UNSATURATED HYDROCABON
HC = HYDROCARBON
PAH = polynuclear aromatic hydrocarbon
SUB = SUBSTITUTED
MIX = MIXTURE OF 2 OR MORE COELUTANTS
ND = NONE DETECTED

CLP 17514

SAMPLE DATA SUMMARY: ORGANIC TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NUMBER	ANALYSIS FRACTION (VOA/BNA)	ESTIMATED CONCENTRATION VALUE	ESTIMATED CONCENTRATION UNITS	QUALIFIER CODE	COMPOUND NAME
GJPS4	VOA				ND
	BNA	1300	ug/kg	ISO	$C_{15}H_{12}$ PAH, such as methyl anthracene
		870		ISO	$C_{15}H_{10}$ PAH, such as cyclopentaphenanthrene
		200		ISO	$C_{16}H_{12}$ - phenyl naphthalene
		1540		TOT/ISO	$C_{17}H_{12}$ PAH, such as methyl pyrene (3)
		440		ISO	benzonaphthothiophene $C_{16}H_{10}S$
↓	↓	2000	↓	ISO	$C_{20}H_{12}$ PAH, such as benzo(e)pyrene
GJPS5	VOA				ND
	BNA	390	ug/kg	TOT/ISO	$C_{17}H_{12}$ PAH, such as methyl pyrene (4)
		130		ISO	benzanthracenone $C_{17}H_{10}O$
		86			benzonaphthothiophene $C_{16}H_{10}S$
		170		ISO	$C_{20}H_{16}$ PAH, such as dimethyl benz(a) anthracene
		260		ISO	$C_{20}H_{14}$ - such as binaphthalene
		990		ISO	$C_{20}H_{12}$ PAH such as benzo(e) pyrene
		1500		TOT	Sat'd HC (2)
↓	↓	2750	↓	TOT/Unk	unknowns (2)
GJPS6	VOA				ND
	BNA	520	ug/kg	ISO	$C_{15}H_{12}$ PAH - such as methyl anthracene
		160		ISO	$C_{15}H_{10}$ - cyclopentaphenanthrene
		160		ISO	$C_{17}H_{12}$ PAH such as methyl pyrene
		260		ISO	benzanthracenone $C_{17}H_{10}O$
		2200		ISO	$C_{20}H_{12}$ PAH such as benzo(e) pyrene
		7300		TOT	Sat'd HC (4)
↓	↓	9900	↓	Unk	unknown

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UNSAT HC = UNSATURATED HYDROCABON
HC = HYDROCARBON
PAH = polynuclear aromatic hydrocarbon
SUB = SUBSTITUTED
MIX = MIXTURE OF 2 OR MORE COELUTANTS
ND = NONE DETECTED

CLP 17514.

SAMPLE DATA SUMMARY: ORGANIC TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NUMBER	ANALYSIS FRACTION (VOA/BNA)	ESTIMATED CONCENTRATION VALUE	UNITS	QUALIFIER CODE	COMPOUND NAME
CJP57	VOA				ND
	BNA	5900	ug/kg	TOT	Sat'd HC (2)
		4500		TOT	triterpane HC (3)
		2100		ISO	$C_{15}H_{12}$ PAH, such as methylanthracene
		380		ISO	$C_{15}H_{10}$ - cyclopentaphenanthrene
		380		ISO	$C_{14}H_8O_2$ - anthracenedione
		280			benzanthracenone, $C_{17}H_{10}O$
		950		TOT ISO	$C_{17}H_{12}$ PAH, such as benzo(a)fluorene (4)
		190		ISO	$C_{18}H_{12}$, benzo(c)phenanthrene (PAH)
		660		ISO TOT	$C_{19}H_{14}$ PAH, such as methylbenzoanthracene (2)
		5500		ISO	$C_{20}H_{12}$ PAH, such as benzo(j)fluoranthene
↓	↓	5700	↓	UNK	unknown
CJP58	VOA				ND
	BNA	2500	ug/kg	TOT ISO	$C_{15}H_{24}$ - substituted methanoindene (2)
		1400			aldehyde
		820		ISO	$C_{20}H_{12}$ PAH such as benzo(e)pyrene
↓	↓	14,400	↓	TOT	Sat'd HC (4)
CJP59	VOA	11,100	ug/kg	TOT	Sat'd HC (4)
		1300		TOT ISO	C_9H_{12} - C3 alkylbenzene
		920			aliphatic alcohol
	↓	650		UNK	poss. cyclic HC
	BNA	33,000		ISO	$C_{15}H_{12}$ PAH - such as methylanthracene
		20,000		ISO	$C_{16}H_{14}$ - dimethylphenanthrene (PAH)
		15,000		ISO	$C_{15}H_{28}$ - decahydrotetramethylnaphthalene
↓	↓	770,000	↓	TOT	Sat'd HC (17)

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UNSAT HC = UNSATURATED HYDROCABON
HC = HYDROCARBON
PAH - polynuclear aromatic hydrocarbon
SUB = SUBSTITUTED
MIX = MIXTURE OF 2 OR MORE COELUTANTS
ND = NONE DETECTED

(Lee 17514.

SAMPLE DATA SUMMARY: ORGANIC TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NUMBER	ANALYSIS FRACTION (VOA/BNA)	ESTIMATED CONCENTRATION VALUE	UNITS	QUALIFIER CODE	COMPOUND NAME
CJP60	VOA				ND
	BNA	15,400	ug/kg	TOT	Sat'd HC (5)
		210			Carboxylic acid
		900		TOT/UNK	Unsat'd HC of unknown subst (2)
		8100		TOT/UNK	Unknowns (8)
CJP61	VOA				ND
	BNA	600	ug/kg	TOT	pregnane (2)
		1100		TOT	Cholestane (2)
		330			Cholestenol
		1600			homoandrostane
		4700		TOT	Steral derivatives (3)
		840			Carboxylic acid
		280			Sat'd HC
		1200		TOT/UNK	Unsat'd HC of Unknown subst (3)
		560			triterpane HC
		2800		TOT/UNK	Unknowns (4)
CJP62	VOA	7400	ug/kg		alkyl cyclohexane
		61,400		TOT	Sat'd HC (5)
		28,700		TOT/ISO	C_9H_{12} - C_3 alkyl benzene (4)
	BNA	546,000		TOT	Sat'd HC (11)
		33,000		MIX/ISO	Carboxylic acid + $C_{15}H_{12}$ PAH, methyl anthracene
		27,000			Carboxylic acid
		62,000			Tris(methylphenyl) ester of phosphoric acid
		140,000		TOT/UNK	Unknown aromatic HC (2)
		48,000		SUS	phthalate

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UNSAT HC = UNSATURATED HYDROCABON
HC = HYDROCARBON
PAH - polynuclear aromatic hydrocarbon
SUB = SUBSTITUTED
MIX = MIXTURE OF 2 OR MORE COELUTANTS
ND = NONE DETECTED

Lee 17514

SAMPLE DATA SUMMARY: ORGANIC TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NUMBER	ANALYSIS FRACTION (VOA/BNA)	ESTIMATED CONCENTRATION VALUE	UNITS	QUALIFIER CODE	COMPOUND NAME
CJP63	VOA				ND
	BNA	57,400	ug/kg	TOT	Sat'd HC (7)
		590,000		TOT	Carboxylic acids (7)
		67,000		TOT	Cholestane (2)
		36,00			Cholestene
		2200			Cholestenone
		2900			homoandrostane
CJP64	VOA				ND
	BNA	102,100	ug/kg	TOT	Sat'd HC (8)
		76,000		TOT UNK	possible cyclic or aromatic HC (4)
		11,000			Carboxylic acid
		8800		Unk	aromatic HC, poss mw 202
		13,000			pregnane
		8800		mix	phthalate + Sat'd HC
		26,000			steral deriv.
		11,000		Unk	unknown

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UNSAT HC = UNSATURATED HYDROCABON
HC = HYDROCARBON
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7.2.2 Inorganic Data Lab Case 17514

7.2.2.1 Summary

Fourteen solid samples and 11 aqueous samples were analyzed for total metals and cyanide through the EPA Contract Laboratory Program (CLP) Routine Analytical Services (RAS) under case no. 17514, Sample Delivery Group (SDG) nos. MCJP30 and MCJP20. Included in the sample set were two duplicate pairs and one aqueous field blank.

The data have been fully reviewed to determine the usability of results according to the National and Regional guidelines. Areas examined in detail are listed in the Support Documentation appendix. Data quality was good for most metals and for cyanide. Detection limit capability was demonstrated for most analytes by meeting criteria for holding times, spike recoveries, calibration check standards, low-level standards, and linear range analyses. Lead inductively coupled plasma (ICP) and graphite furnace atomic absorption (GFAA) results were in good agreement. Few quality control (QC) problems were associated with this case.

The areas of concern include sample quantitation, blank contamination, contract required detection limit (CRDL) standard recoveries, laboratory and field duplicate imprecision, serial dilution, ICP interference, and GFAA post-digestion spike recovery.

Matrix spike recovery could not be evaluated for GFAA lead in the solid matrix (SDG MCJP30). The recovery was determined for ICP lead; however, sample results were reported using both ICP and GFAA lead results.

7.2.2 Qualifiers

- The sample result for zinc in MCJP67 could not be verified by the reviewer. Neither the original result nor the 10X diluted sample result matched the result that appeared on the Form I. The reviewer has changed the reported value of 44,600 mg/kg to the value of 42,800 mg/kg, which can be calculated from the 10X diluted result.

- Several metals were detected in the laboratory and field blanks associated with this case. Consequently, a number of results are considered to be attributable to blank contamination and have been flagged (B) on the data summary. The following table lists each element and affected results.

Analyte	Samples Affected
antimony	MCJP30, MCJP53, MCJP61, and MCJP63
iron	MCJP20 through MCJP22 and MCJP28
thallium	MCJP30, MCJP38, MCJP51, MCJP53, and MCJP61 through MCJP69
zinc	MCJP20, MCJP21, MCJP23, and MCJP26 through MCJP28

- Many antimony results were attributed to blank contamination. ICP interference from iron was apparent in almost every other sample that had an iron concentration above 20,000 mg/kg. The false positive in the interference check sample (ICS) was proportional to the antimony versus iron results in all such samples except MCJP67 and MCJP69 ($r = 0.955$). For the following samples, the antimony results were qualified unreliable (R): MCJP38, MCJP51, MCJP52, MCJP62, MCJP65, and MCJP66. The antimony results for MCJP67 and MCJP69 were even higher than would be expected from this effect. For samples with iron less than 20,000 mg/kg, where antimony results were not already attributed to blank contamination (MCJP64 and MCJP68), the antimony results were also higher than would be expected from this correlation. Therefore, these antimony results were considered to be biased high. However, they were qualified as estimated (J) because of effects observed related to serial dilution.

Sample No.	Interferent Concentration (ug/l) Iron	Sample Analyte Concentration (ug/l) Antimony	Iron/Antimony Ratio
ICS1	182,143	199	915
ICS2	181,953	224	812
MCJP38	134,466.5	168.7	797
MCJP51	160,550	181.5	884
MCJP52	95,278.5	108.9	875
MCJP62	102,411.5	129.8	789
MCJP65	92,544	102.9	899
MCJP66	100,595	111.0	906
MCJP67*	138,030	510.4	270
MCJP69*	209,495	854.4	245

*Without these samples, R = 0.955. With MCJP67 and MCJP69 included, r = 0.44. Sample results for non-starred samples were qualified as unreliable because of correlation with ICP interference check; starred sample results may be affected by interference, but the antimony results are much higher than would be expected from iron interference alone.

- Serial dilution percent differences were outside QC limits for antimony, cadmium, calcium, chromium, iron, magnesium, nickel, and silver for sample MCJP69. All positive cadmium and antimony results in soil were qualified as estimated (J), where not previously qualified (B): MCJP64 and MCJP67 through MCJP69. Positive silver soil results were qualified as estimated (J): MCJP64 and MCJP67 through MCJP69. All positive calcium, chromium, iron, magnesium, potassium, and nickel results in soil were qualified (J), estimated: MCJP63 through MCJP65 and MCJP67 through MCJP69.

- CRDL standard recoveries were greater than QC limits for zinc in SDG MCJP20 and chromium in SDG MCJP30. The zinc results for MCJP22 and MCJP25 and the chromium result for MCJP30 were qualified (K), biased high. Other positive results were already attributed to blank contamination or were outside the affected range (five times the observed difference between true and found results).

- Duplicate imprecision was noted for cadmium and mercury in the soil laboratory duplicate (MCJP67). Positive soil results for cadmium were qualified (J), estimated: MCJP64 and MCJP67 through MCJP69. Positive soil results for mercury were qualified (J), estimated: MCJP63, MCJP64, and MCJP67 through MCJP69.

- Duplicate imprecision was noted for arsenic, calcium, copper, magnesium, and zinc in the sediment field duplicate (MCJP51 and MCJP66). Positive results for these elements in sediment samples (MCJP30, MCJP38, MCJP51 through MCJP53, MCJP61, MCJP62, and MCJP66) were qualified (J), estimated.

- GFAA post-digestion spike recoveries were low for selenium in samples MCJP64 and MCJP67. These results were qualified (L), biased low.

7.2.2.3 Support Data

The Support Documentation appendix to this report documents the above findings associated with blank contamination, sample quantitation, serial dilution, ICP interference, CRDL standard recoveries, duplicate imprecision, and spike recoveries. Documentation pertaining to matrix spike recovery and method of standard addition (MSA), which did not necessitate qualification of data, is also attached. This report has been formatted to address those issues directly affecting the application of the data to the subject investigation. (Issues pertaining to laboratory contractual compliance are addressed on a separate form directed to the laboratory technical project officer.)

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Report reviewed by Russell Sloboda
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SECTION 8.0

8.0 TOXICOLOGICAL EVALUATION

8.1 SUMMARY

Arsenic was detected in a public supply well (PW-1) and two home wells (HW-1 and HW-2) below the enforceable drinking water criterion, or National Primary Drinking Water Regulation (NPDWR). HW-1 and HW-2 are not expected to pose a human health hazard due to arsenic. The water in PW-1 meets the enforceable drinking water criterion for arsenic, and human health effects are not necessarily indicated for this well. However, consumption of more than two liters per day from PW-1 or consumption of this water by small children could result in arsenic intakes above the recommended risk reference dose (RfD) range. Where RfDs are exceeded, potential effects can no longer be ruled out. The carcinogenic status of arsenic at this time is uncertain. Lead was detected in HW-2 above the ideal exposure of zero but below enforceable drinking water criteria. Significant noncarcinogenic impacts would not necessarily be indicated for consumption of this drinking water, although a potential increase in cancer risk could not be ruled out.

It is considered prudent to avoid prolonged direct contact with subsurface soil and with surface soil in the central portion of the landfill area because of copper and antimony concentrations. It is also considered desirable to minimize lead exposure. Many other substances were detected in on-site soil at notable concentrations, including zinc, cyanide, mercury, chromium, vanadium, nickel, silver, cadmium, 4-methylphenol, Aroclor 1254, benzene, toluene, ethylbenzene (EB), and xylenes. Direct contact with subsurface soil or sediment is not expected to pose a significant noncarcinogenic hazard due to these substances in soil, although zinc and copper have been associated with phytotoxicity. The landfill area was reported to be devoid of vegetation. Some potential carcinogenic risk due to benzene and Aroclor 1254 cannot be ruled out.

The following compounds were all detected in environmental media on or in the vicinity of the Inactive Landfill Site: tetrachloroethene (PCE), trichloroethene (TCE), 1,2-dichloroethene (1,2-DCE), vinyl chloride, 1,1,1-trichloroethane (1,1,1-TCEA), 1,1-dichloroethane (1,1-DCEA), polycyclic aromatic hydrocarbons (PAHs), and phthalates. None of the reported concentrations of these solvents in soil, surface water, or sediment are expected to pose a significant noncarcinogenic health hazard Some potential carcinogenic risk due to PCE, TCE, PAHs, bis(2-ethylhexyl) phthalate (DEHP), and vinyl chloride cannot be ruled out.

Copper, lead, aluminum, iron, and zinc were detected in surface water above Ambient Water Quality Criteria (AWQCs). Copper, pentachlorophenol (PCP), and cyanide were also detected at notable concentrations in sediment. In the cases of most metals, midstream or downstream concentrations were higher than upstream concentrations. Noncarcinogenic human health effects are not anticipated. However, PCP is classified as a Group B2 carcinogen and can theoretically increase overall cancer risk. Bioaccumulation is a potential concern for copper, lead, and PCP.

8.2 SUPPORT DATA

8.2.1 Inorganics

Copper was detected in on-site surface (up to 130,000 mg/kg) and subsurface soil (up to 122,000 mg/kg). An oral human TDLo (lowest observed toxic dose) of 120 ug/kg has been reported for copper; the reported reaction was gastrointestinal irritation.[1] Copper compounds can also be irritating to the skin, and chronic high-level exposure has been associated with anemia.[2] Average daily total copper intake (including food and water) is reported to be about 2.5 mg/day (approximately 36 ug/kg for a 70-kilogram adult).[3] If 100 mg of the most contaminated surface or subsurface soil were incidentally ingested by a 70-kilogram adult, the estimated copper intake would be approximately 180 ug/kg. A child's intake dose would be expected to be greater, considering the greater amount of contact with soil (during play, especially) and lower body weight. A direct comparison to the TDLo cannot be made because of potential differences in absorption from a soil matrix (likely to be low) and individual differences in metabolism. However, it is considered prudent to avoid prolonged direct contact with subsurface soil and with surface soil in the central portion of the landfill area.

Copper can also be accumulated by plants; however, this is limited by the metal's phytotoxic effects.[4] Plant uptake and phytotoxicity are especially likely to occur at low pH; the reported soil pH at the Inactive Site is neutral (6.8 to 7.3). The landfill area was reported to be devoid of vegetation.

Sheep are considered to be very susceptible to copper toxicity; cattle are more resistant.[2] Neither type of animal is expected to be present at the site; however, the possibility exists that some wild animals may be copper sensitive. Because the literature focuses on laboratory and farm animals, potential effects on wild fauna are largely unknown. Aquatic animals have been more widely studied and will be discussed in conjunction with surface water/sediment results.

Copper was detected in surface water from the secondary stream (up to 47.4 ug/l midstream, 15.4 ug/l downstream) and in the primary stream (51.9 ug/l upstream) above the AWQC of 12 ug/l.[5] Potential effects on sensitive aquatic species cannot be ruled out where AWQCs are exceeded. Copper was also reported in midstream secondary stream sediment at 4,530 mg/kg. Two environmental fate processes are important for copper: sorption onto soil/sediment and bioaccumulation. Bioconcentration factors (BCFs) ranging from 12 to 1,670 have been reported (up to 30,000 for mollusks).[2,6] Minnows were reported swimming in the unnamed perennial stream (see section 5.3). Some LC50s (concentration lethal to 50 percent of an experimental population) for two species of freshwater minnows are given here for copper: bluntnose minnow, 48-hour LC50 750 to 21,000 ug/l; fathead minnow, 96-hour LC50 436 to 23,600 ug/l.[7] Reported growth-inhibiting and photosynthesis-inhibiting concentrations for freshwater algae range from 1 to 8,000 ug/l.[7]

Lead was detected in on-site surface (up to 6,560 mg/kg) and subsurface (up to 6,240 mg/kg) soil. Lead has been seen to affect the hematopoietic, gastrointestinal, renal, and nervous systems.[1,8] Children are especially lead sensitive due to their developing nervous systems and greater lead absorption.[9] Lead, however, binds strongly to soil, decreasing its availability. The higher lead concentrations reported at this site exceed CERCLA-site-recommended clean-up guidelines of 500 to 1,000 ppm.[10] Inadvertent ingestion of 100 mg of the most contaminated soil would result in a lead intake of 656 ug. Daily lead intake from food, dust, etc. has been reported to range from 50.7 to 345.7 ug/day for adults and from 46.6 to 295.6 ug/day for children (assuming no occupational exposure, not residing near smelter).[11] Chronic exposure could be undesirable, as increases in blood lead have been reported from chronic lead exposure (35 days or longer).[12] Effects from increased blood lead range from enzyme inhibition through anemia and encephalopathy in extreme cases.[9] The potential for adverse noncarcinogenic effects is increased for receptors who would have direct contact with the high-level soil areas. It would be prudent to avoid prolonged contact with on-site soil because of the lack of an identifiable toxicity threshold, although significant noncarcinogenic effects would not necessarily be indicated. Lead is also classified as a Group B2 carcinogen and, as such, theoretically poses an increased cancer risk.[13]

Lead tends to bind strongly to soil, although plant uptake can occur, especially in leafy crops.[2] Cattle are more susceptible to lead than to copper.[2] Aquatic toxicity will be considered in the discussion of surface water and sediment.

Lead was detected in the secondary stream (midstream up to 6.7 ug/l) and in the primary stream (upstream at 5.4 ug/l) above the AWQC of 3.2 ug/l.[5] Potential effects on sensitive aquatic species cannot be ruled out. Lead is generally undesirable in aquatic environments because of its tendency to bioconcentrate (BCFs reportedly range from 42 to 1,700).[6,14] Sorption onto sediment is also an important environmental fate pathway for lead.[6] Ninety-six-hour LC50s for fathead minnows are reported to be 7,480 ug/l for lead acetate and greater than 75,000 ug/l for lead chloride; however, other species of fish, such as brook trout, can be affected by lead compounds as low as 14 ug/l.[14]

Lead was detected in HW-2 at 2 ug/l. The Maximum Contaminant Level Goal (MCLG) for lead is set at zero because it is considered ideal to minimize consumption of this metal.[15] However, this lead level is below the Action Level of 15 ug/l and the NPDWR of 50 ug/l.[15,16,17] Significant noncarcinogenic impacts would not necessarily be indicated for consumption of this drinking water, although a potential increase in cancer risk cannot be ruled out, according to the no-threshold theory of carcinogenicity. Lead can sometimes be observed in home wells from parts of the distribution system, such as lead solder.[3]

Antimony was detected in on-site surface (165 mg/kg) and subsurface (up to 239 mg/kg) soil. Antimony is used in metal alloys, pigments, paints and glazes, and explosives.[8] At high levels, it can cause skin irritation and cardiac toxicity.[8] Adverse effects are not expected for casual direct contact with soil, assuming 100 mg soil incidentally ingested by a 70-kilogram adult.[13] However, if children were to dig and play in the highest-concentration soil, they could conceivably be exposed to a concentration exceeding the RfD (e.g., 25-kilogram child incidentally ingesting 100 to 200 mg soil).[13] Therefore, it is considered prudent to avoid prolonged contact with or playing in subsoil and surface soil in the central portion of the landfill.

Cyanide, a substance that, like copper and lead, can be associated with plating waste, was detected in subsurface soil up to 10.5 mg/kg. Cyanide was also detected in primary stream sediment (downstream at 0.41 mg/kg), secondary stream sediment (midstream up to 0.37 mg/kg, downstream at 0.37 mg/kg), and sediment downstream of the confluence of the two streams (0.28 mg/kg). Cyanide is generally not considered to be a major environmental problem because of its lack of persistence.[18,19] Cyanide compounds are readily metabolized and do not overcome the metabolic pathways of most organisms until relatively high concentrations are reached.[1,6] Direct contact with subsurface soil or sediment is not expected to pose a significant health or environmental hazard due to cyanide.[13]

Mercury was detected in surface soil up to 5.4 mg/kg and in subsurface soil up to 60.5 mg/kg. Cadmium was detected in surface soil at 28.4 mg/kg and in subsurface soil up to 45.4 mg/kg. Mercury is used in the plating, textile, ore extraction, paint and pigment, and pharmaceutical industries; cadmium has been used in paints, the aircraft industry, and the plating industry.[8] Reported toxic effects for mercury include skin irritation and damage to the kidneys and nervous system; cadmium can affect the kidneys and prostate.[8] Assuming incidental ingestion of 100 mg soil, the RfD for either metal would not be exceeded for a 70-kilogram adult or a 25-kilogram child.[13]

Zinc, another metal used in plating and other industries, was detected in on-site surface soil up to 35,400 mg/kg and in subsurface soil up to 66,900 mg/kg. Zinc is an essential metal not usually noted for toxicity.[9] Based on a comparison between estimated incidental soil intake and the RfD, significant human health impacts are not expected from reported zinc levels in soil.[13] Zinc, like copper, has been associated with phytotoxicity at high levels.[4] The central landfill area is reportedly devoid of vegetation.

Chromium and vanadium were detected at notable levels in one subsurface soil sample (1,560 mg/kg and 507 mg/kg, respectively). Chromium is used in plating; vanadium is used in metal alloys and some glazes.[8] Chromium can be associated with skin irritation and liver and kidney toxicity.[8] Vanadium is not usually noted for toxicity, although it, too, can cause skin irritation.[8] Silver and nickel, two other metals associated with the plating and electronics industries, were detected in surface (up to 41.8 mg/kg and 550 mg/kg, respectively) and subsurface (up to 30.1 mg/kg and 776 mg/kg, respectively) soil.[8] Nickel can cause allergic dermatitis; silver is generally not known for adverse effects beyond argyria, a skin pigmentation.[8,9] Significant impacts are not expected for direct contact with reported concentrations of these metals in soil, based on a comparison between estimated incidental intake and the RfD.[13]

Aluminum and iron are two common elements that, like zinc, are not generally known for toxicity. The following surface water concentrations exceeded the AWQCs of 87 ug/l for aluminum, 1,000 ug/l for iron, and 110 ug/l for zinc: secondary stream, upstream (aluminum at 304 ug/l); secondary stream, midstream (aluminum up to 531 ug/l, iron up to 1,970 ug/l, zinc up to 180 ug/l); secondary stream, downstream (aluminum at 261 ug/l, zinc at 150 ug/l); primary stream, upstream (aluminum at 422 ug/l); primary stream, downstream (aluminum at 100 ug/l); downstream of confluence (aluminum at 174 ug/l).[5,20] Where AWQCs are exceeded, potential effects on sensitive aquatic species cannot be ruled out.

Arsenic was detected in all three sampled potable wells: PW-1 (16 ug/l), HW-1 (3 ug/l), and HW-2 (3 ug/l). Currently, there is debate within the scientific and regulatory communities on the arsenic issue.[21] Some studies suggest that arsenic is carcinogenic, and other studies demonstrate that it may be an essential element. Consequently, there are differing standards by which the drinking water can be judged. All three of these wells meet the enforceable drinking water criterion, or NPDWR, of 50 ug/l.[16] Daily consumption of two liters by a 70-kilogram adult (unlikely for HW-1, a church well) would result in arsenic intakes of 4.6E-4 mg/kg/day for PW-1 and 8.6E-5 mg/kg/day for HW-1 and HW-2. EPA recommends an RfD of 3E-4 mg/kg/day, which would be exceeded by PW-1.[21] However, because of the uncertainty involved, the recommended range can be considered to be 1E-4 to 8E-4 mg/kg/day.[21] The concentration for PW-1 does fall within this range for a 70-kilogram adult, although daily consumption of one liter by a 15-kilogram child would result in an intake of 1E-3 mg/kg/day, which is just above this range. The effects reported in the studies used to establish these levels were hyperpigmentation, keratosis, and "blackfoot disease" (a disease affecting the peripheral vasculature).[9,21] Arsenic is classified as a Group A oral human carcinogen.[13] However, EPA's on-line source of carcinogenic status information currently lists no information under the oral carcinogenicity heading.[21] If a formerly available unit cancer risk of 5×10^{-5} per ug/l is used, estimated cancer risks of 8E-4, 2E-4, and 2E-4 can be estimated for PW-1, HW-1, and HW-2, respectively.[13] In conclusion, it can be stated at this time that HW-1 and HW-2 are not expected to pose a noncarcinogenic human health hazard due to arsenic. The water in PW-1 meets the enforceable drinking water criterion for arsenic, and noncarcinogenic human health effects are not necessarily indicated for this well. However, consumption of more than two liters per day or consumption of this water by small children could result in arsenic intakes above the recommended RfD range. Where RfDs are exceeded, potential effects can no longer be ruled out. A potential increase in cancer risk cannot be ruled out.

Sodium was detected in HW-2 at 22,700 ug/l. This exceeds a guideline recommended by the American Heart Association (20,000 ug/l) to reduce the contribution of drinking water to total sodium intake.[22] Although this can be significant for persons on sodium-restricted diets, adverse effects on the general population are not expected.

8.2.2 Organics

The following solvents were all detected in environmental media on or in the vicinity of the Inactive Landfill Site: PCE, TCE, 1,2-DCE, vinyl chloride, 1,1,1-TCEA, and 1,1-DCEA. These compounds are related to each other, with the chlorinated ethenes differing from each other only by the amount of chlorination (the same holds true for the chlorinated ethanes). It has been reported that these compounds can undergo reductive dechlorination in the environment (e.g., TCE can degrade to the less chlorinated 1,2-DCE).[23] These solvents are also similar in their physicochemical properties (volatile, mobile in the environment, tending to evaporate from surface media) and their toxicological properties (affecting the skin, nervous system, and liver).[1,6,8] PCE and TCE are classified as Group B2 carcinogens, and vinyl chloride is classified as a Group A carcinogen.[13]

These compounds and their reported environmental concentrations are as follows: PCE (surface soil, up to 4 ug/kg; subsoil, up to 46 ug/kg; midstream secondary stream surface water, up to 1 ug/l; downstream secondary stream surface water, 9 ug/l); TCE (subsoil, up to 11 ug/kg; midstream secondary stream surface water, up to 5 ug/l; downstream secondary stream surface water, 14 ug/l, and sediment, up to 3 ug/kg; surface water downstream of the confluence, 1 ug/l); 1,2-DCE (subsoil, up to 15 ug/kg; midstream secondary stream surface water, up to 36 ug/l, and sediment, up to 34 ug/kg; downstream secondary stream surface water, 64 ug/l, and sediment, 76 ug/kg; surface water downstream of the confluence, 4 ug/l); vinyl chloride (midstream secondary stream surface water, up to 21 ug/l; downstream secondary stream surface water, 23 ug/l); 1,1,1-TCEA (midstream secondary stream surface water, up to 3 ug/l; downstream secondary stream surface water, 8 ug/l, and sediment, 16 ug/kg); 1,1-DCEA (surface soil, up to 28 ug/kg; subsoil, up to 10 ug/kg; midstream secondary stream surface water, up to 2 ug/l, and sediment up to 8 ug/kg; downstream secondary stream surface water, 3 ug/l, and sediment, 3 ug/kg). The highest-concentration surface soil is the same sample (S-2, in the central portion of the landfill) for which the highest concentrations of metals were observed.

None of the reported concentrations of these solvents in soil, surface water, or sediment are expected to pose a significant noncarcinogenic health hazard.[1,13] TCE, PCE, and vinyl chloride can theoretically increase overall cancer risk if contacted during recreational or work activities.[13] The surface water levels are all well below reported aquatic toxicity criteria; Lowest Observed Effect Levels (LOELs) range in the hundreds and, more typically, thousands of ug/l.[5,24]

Some of these compounds were also detected in PW-1: TCE (34 ug/l), PCE (3 ug/l), and 1,2-DCE (1 ug/l). The TCE result is more than six times the Maximum Contaminant Level (MCL) of 5 ug/l.[15,16] However, this well is reportedly treated with a stripping tower (a method commonly used to remove volatile chlorinated solvents) and was sampled pre-treatment. Therefore, TCE intakes at the point of exposure are not likely to be as high as 34 ug/l. Because this well is a municipal supply well that must meet the standard of 5 ug/l, it is expected that customers of this water company would receive 5 ug/l or less in their water. If the water were consumed at the pre-treatment levels, there is no evidence to suggest that significant noncarcinogenic effects would be expected.[1] However, oral cancer risks of approximately 1E-5 for TCE and 4E-6 for PCE could be estimated.[13] The PCE and 1,2-DCE results fall below their MCLs of 5 ug/l and 70 ug/l (based on the cis isomer), respectively.[25] The volatile TCE and PCE can also contribute to increased cancer risk via inhalation (from showering, cooking, etc.) for domestic water.

Another group of related compounds detected at the site consists of benzene, toluene, EB, and xylenes. These compounds were detected in surface (toluene 44 ug/kg, EB 12 ug/kg, xylenes 500 ug/kg) and subsurface (benzene 5 ug/kg, toluene up to 100,000 ug/kg, EB up to 28,000 ug/kg, xylenes up to 190,000 ug/kg) soil. The most notable subsoil sample was SS-1, in the central portion of the landfill. These compounds can be associated with petrochemicals; they are also solvents.[1,8] They are not especially noted for noncarcinogenic toxicity at nonoccupational concentrations and are not expected to pose significant noncarcinogenic hazards at the reported soil concentrations.[1,13] Benzene is classified as a Group A carcinogen and may pose an increased cancer risk.[13] Because the benzene-related compounds can be fairly mobile in soil, the potential exists for migration through subsurface soil and groundwater.[6] These compounds were not detected in the three wells sampled.

PCP was detected in upstream drainage ditch sediment at 170 ug/kg and in primary upstream sediment at 66 ug/kg. PCP is a pesticide and wood preservative that has a pH-dependent AWQC of 13 ug/l in water.[5,24] Aquatic organisms are typically affected by PCP in the range of 1 ug/l to 1 mg/l.[24] PCP tends to bind to sediment rather than dissolve in surface water, and no PCP was detected in the surface water.[24] A potential concern for the presence of PCP in sediment is bioconcentration; goldfish BCFs up to 1,000 have been reported.[24,26] Noncarcinogenic human health effects are not anticipated. However, PCP is classified as a Group B2 carcinogen and can theoretically increase overall cancer risk.[13]

4-Methylphenol, an irritant and component of essential oils, was detected in one subsurface soil sample at 17,000 ug/kg.[1,24] No significant impacts would be expected for casual direct contact with this soil sample, based on a comparison between estimated intake (100 mg soil by a 70-kilogram adult) and the RfD.[13] 4-Methylphenol is a semivolatile compound that has the potential to migrate in environmental media.

A polychlorinated biphenyl (PCB) mixture, Aroclor 1254, was detected in one subsurface soil sample at 6,200 ug/kg. PCBs are extremely stable, persistent compounds that are considered to be fairly ubiquitous in the environment. In general, EPA has recommended clean-down guidelines of 10,000 ug/kg for unlimited-access areas to 25,000 ug/kg for limited-access areas.[27] However, a protective quantification level of 1,000 ug/kg has been proposed for residential soils.[28] Capping has been an accepted practice for handling landfills contaminated with PCBs because volatilization is therefore reduced and because PCBs are not very mobile in soil, tending to bind to the organic carbon.[29] The presence of Aroclor 1254 in one subsoil sample at the reported concentration is not expected to pose a significant health or environmental hazard. Detection of PCBs at other locations, if it happened, could alter that conclusion. For example, PCBs are especially undesirable in aquatic environments because of their extreme tendency to bioconcentrate (BCFs can range from 10,000 to 1,000,000).[6] Also, PCBs are classified as Group B2 carcinogens, and contact with them can theoretically increase overall cancer risk.[13]

PAHs and PAH-related compounds were confidently and tentatively identified in on-site surface soil (up to 6,500 ug/kg confidently and 68,000 ug/kg tentatively identified), subsurface soil (up to 11,400 ug/kg confidently and 33,000 ug/kg tentatively identified), primary stream sediment (up to 13,580 ug/kg confidently and 2,026 ug/kg tentatively identified upstream, up to 10,738 ug/kg confidently and 3,300 ug/kg tentatively identified downstream), upstream drainage ditch sediment (33,650 ug/kg confidently and 10,440 tentatively identified), secondary stream sediment (up to 213 ug/kg upstream, 631 ug/kg midstream, and up to 1,700 ug/kg confidently and 310 ug/kg tentatively identified downstream), and sediment downstream of the confluence (up to 52,540 ug/kg confidently and 6,350 ug/kg tentatively identified), compared to 499 ug/kg in background soil. PAHs are found in coal and tar and the products of organic combustion.[8,9] PAHs have been seen to cause dermatitis and phototoxicity in sensitive individuals at high concentrations.[8,9] Such effects are not necessarily indicated at this site. Some PAHs are classified as Group B2 carcinogens and may increase overall cancer risk.[13] PAHs tend to adsorb onto sediments and are not usually very mobile in surface water. In spite of their lipophilicity, PAHs tend to be metabolized rather than bioaccumulate in most aquatic organisms, limiting potential exposure to vertebrate fish and fish consumers.[6]

Phthalates were confidently and tentatively identified in subsurface soil (up to 63,000 ug/kg confidently and up to 48,000 ug/kg tentatively identified). Phthalates, as plasticizers, are ubiquitous in the environment.[9] Phthalates are noted for low acute and low chronic toxicity; no significant noncarcinogenic impacts are expected. DEHP, one phthalate ester detected in the subsoil, is classified as a Group B2 carcinogen.[13] According to the no-threshold theory of carcinogenicity, any contact with carcinogens can increase overall cancer risk.

Tris(methylphenyl) ester of phosphoric acid was tentatively identified in subsoil from the central portion of the landfill at approximately 62,000 ug/kg. This phosphate is a neurotoxicant for which a monkey LDLo (lowest observed lethal dose) of 1,000 mg/kg and an oral rat LD50 (dose lethal to 50 percent of an experimental population) of 1,160 mg/kg have been reported.[1] Poisonings have been reported for humans consuming alcoholic drinks tainted with two percent of this substance.[1] From the limited information available, there is no evidence to suggest that this tentatively identified compound (TIC) should to pose a significant hazard at the reported concentration.

An unknown hydrocarbon was tentatively identified at approximately 3 ug/l in PW-1. No toxicological assessment of this unknown compound can be made.

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APPENDIX A

2B

SOIL VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: COMPUCHEM,RTP Contract: 68D00159

Lab Code: COMPU Case No.: 17514 SAS No.: _____ SDG No.: CJP38

Level:(low/med) LOW

	EPA SAMPLE NO.	SMC1 (TOL) #	SMC2 (BFB) #	SMC3 (DCE) #	OTHER	TOT OUT
01	CJ961	105	89	95	0	0
02	CJ963	97	96	100	0	0
03	CJP38	102	98	121	0	0
04	CJP52	113	98	118	0	0
05	CJP53	102	89	90	0	0
06	CJP54	105	95	101	0	0
07	CJP55	102	91	99	0	0
08	CJP56	99	83	93	0	0
09	CJP57	102	83	95	0	0
10	CJP58	110	95	100	0	0
11	CJP59	109	106	92	0	0
12	CJP59RE	113	111	112	0	0
13	CJP60	99	103	106	0	0
14	CJP62	120	104	105	0	0
15	CJP63RE	120	103	102	0	0
16	CJP64	88	81	85	0	0
17	CJP60MS	104	103	101	0	0
18	CJP60MSD	106	103	106	0	0
19	VBLKP2	99	94	103	0	0
20	VBLKP3	108	101	99	0	0
21	VBLKP5	93	93	87	0	0
22	VBLKS3	106	107	105	0	0
23	VBLKQ4	105	102	99	0	0
24	VBLKS7	89	90	91	0	0
25	VBLKW8	87	85	81	0	0

	QC LIMITS
SMC1 (TOL) = Toluene-d8	(84-138)
SMC2 (BFB) = Bromofluorobenzene	(59-113)
SMC3 (DCE) = 1,2-Dichloroethane-d4	(70-121)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D System Monitoring Compound diluted out

2B

SOIL VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: COMPUCHEM,RTP Contract: 68D00159

Lab Code: COMPU Case No.: 17514 SAS No.: _____ SDG No.: CJP38

Level:(low/med) MED

	EPA SAMPLE NO.	SMC1 (TOL) #	SMC2 (BFB) #	SMC3 (DCE) #	OTHER	TOT OUT
01	CJP62DL	88	85	90	0	0
02	CJP62DLMS	93	92	97	0	0
03	CJP62DLMSD	90	90	94	0	0
04	VBLKR9	97	98	99	0	0

	QC LIMITS
SMC1 (TOL) = Toluene-d8	(84-138)
SMC2 (BFB) = Bromofluorobenzene	(59-113)
SMC3 (DCE) = 1,2-Dichloroethane-d4	(70-121)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D System Monitoring Compound diluted out

3B

SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: COMPUCHEM,RTP Contract: 68D00159

Lab Code: COMPU Case No.: 17514 SAS No.: _____ SDG No.: CJP38

Matrix Spike - EPA Sample No.: CJP60 Level:(low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
1,1-Dichloroethene	63.30	0	62.66	99	59-172
Trichloroethene	63.30	0	70.88	112	62-137
Benzene	63.30	0	71.01	112	66-142
Toluene	63.30	0	71.77	113	59-139
Chlorobenzene	63.30	0	71.64	113	60-133

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1,1-Dichloroethene	63.30	70.38	111	11	22	59-172
Trichloroethene	63.30	80.25	127	13	24	62-137
Benzene	63.30	80.13	127	13	21	66-142
Toluene	63.30	77.97	123	8	21	59-139
Chlorobenzene	63.30	80.63	127	12	21	60-133

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 5 outside limits
Spike Recovery: 0 out of 10 outside limits

COMMENTS: CLP,17514,CJP38,CJP60,LOW,SOIL,467966,VOA,EPA,F50054
DB624,GU911211B54,BH911211B54,GH069049B54

3B

SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: COMPUCHEM,RTP Contract: 68D00159

Lab Code: COMPU Case No.: 17514 SAS No.: _____ SDG No.: CJP38

Matrix Spike - EPA Sample No.: CJP62DL Level:(low/med) MED

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
1,1-Dichloroethene	9920	0	10710	108	59-172
Trichloroethene	9920	0	9127	92	62-137
Benzene	9920	0	9365	94	66-142
Toluene	9920	100800	112700	120	59-139
Chlorobenzene	9920	0	8889	90	60-133

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1,1-Dichloroethene	9920	7278	73	39 *	22	59-172
Trichloroethene	9920	8730	88	4	24	62-137
Benzene	9920	9286	94	0	21	66-142
Toluene	9920	107900	72	50 *	21	59-139
Chlorobenzene	9920	9048	91	1	21	60-133

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 2 out of 5 outside limits
Spike Recovery: 0 out of 10 outside limits

COMMENTS: CLP,17514,CJP38,CJP62,MED,SOIL,467968,VOA,EPA,F50053
DB624,CS911211B53,BF911211B53,CN068683B53

7A

VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: COMPUCHEM,RTP Contract: 68D00159

Lab Code: COMPU Case No.: 17514 SAS No.: _____ SDG No.: CJP21

Instrument ID: F50051 Calibration date: 12/11/91 Time: 1344

Lab File ID: CS911211A51 Init. Calib. Date(s): 12/10/91 12/10/91

Heated Purge: (Y/N) N Init. Calib. Times: 1459 1741

GC Column: DB-624 ID: 0.530(mm)

COMPOUND	RRF	RRF50	MIN RRF	%D	MAX %D	
Chloromethane	1.085	0.495		54.4		no hits
Bromomethane	1.849	1.274	0.100	31.1	25.0	no hits
Vinyl Chloride	1.378	0.943	0.100	31.6	25.0	pos J in CJP25,26 +30
Chloroethane	1.175	0.758		35.5		
Methylene Chloride	2.065	2.069		-0.2		
Acetone	0.475	0.390		17.9		
Carbon Disulfide	4.887	4.727		3.3		
1,1-Dichloroethene	1.788	1.574	0.100	12.0	25.0	
1,1-Dichloroethane	3.195	3.019	0.200	5.5	25.0	
1,2-Dichloroethene (total)	1.706	1.580		7.4		
Chloroform	4.033	3.881	0.200	3.8	25.0	
1,2-Dichloroethane	2.782	2.675	0.100	3.8	25.0	
2-Butanone	0.419	0.239		43.0		no hits
1,1,1-Trichloroethane	0.906	0.806	0.100	11.0	25.0	
Carbon Tetrachloride	0.951	0.832	0.100	12.5	25.0	
Bromodichloromethane	0.942	0.841	0.200	10.7	25.0	
1,2-Dichloropropane	0.525	0.445		15.2		
cis-1,3-Dichloropropene	0.763	0.643	0.200	15.7	25.0	
Trichloroethene	0.567	0.516	0.300	9.0	25.0	
Dibromochloromethane	0.891	0.749	0.100	15.9	25.0	
1,1,2-Trichloroethane	0.415	0.342	0.100	17.6	25.0	
Benzene	1.089	0.979	0.500	10.1	25.0	
Trans-1,3-Dichloropropene	0.554	0.460	0.100	17.0	25.0	
Bromoform	0.665	0.544	0.100	18.2	25.0	
4-Methyl-2-Pentanone	0.415	0.298		28.2		no hits
2-Hexanone	0.252	0.174		31.0		no hits
Tetrachloroethene	0.668	0.579	0.200	13.3	25.0	
1,1,2,2-Tetrachloroethane	0.682	0.527	0.500	22.7	25.0	
Toluene	1.346	1.253	0.400	6.9	25.0	
Chlorobenzene	1.124	1.048	0.500	6.8	25.0	
Ethylbenzene	0.541	0.508	0.100	6.1	25.0	
Styrene	1.149	1.022	0.300	11.0	25.0	
Xylene (total)	0.744	0.674	0.300	9.4	25.0	
Toluene-d8	1.128	1.083		4.0		
Bromofluorobenzene	0.904	0.841	0.200	7.0	25.0	
1,2-Dichloroethane-d4	2.410	2.182		9.5		

All other compounds must meet a minimum RRF of 0.010.

(5)

1A

RGANICS ANALYSIS DATA SHEET

	EPA SAMPLE NO.	EPA SAMPLE NO.
	CJP59	CJP59RE

P _____ Contract: 68D00159

se No.: 17514 SAS No.: _____ SDG No.: CJP38 SDG No.: CJP38

OIL Lab Sample ID: 467965 D: 467965

5.0 (g/mL) G Lab File ID: GH067965A13 G2R67965B54 3g

OW Date Received: 12/06/91 ed: 12/06/91

22 Date Analyzed: 12/07/91 ed: 12/11/91

II 0.530 (mm) Dilution Factor: 1.0 tor: 1.0 (1.7)

_____ (uL) Soil Aliquot Volume: _____(uL) Volume: _____(uL)

COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q		CS: G/KG	Q	
-Chloromethane	13	U		21	U	
-Bromomethane	13	U		21	U	
-Vinyl Chloride	13	U		21	U	
-Chloroethane	13	U		21	U	
-Methylene Chloride	65	B	✓	78	BD	
-Acetone	13	U	✓	(IL=410) 880	BDE	✓ R
-Carbon Disulfide	13	U		21	U	
-1,1-Dichloroethene	13	U		21	U	
-1,1-Dichloroethane	28		✓ ← 2x higher	14	DJ	
-1,2-Dichloroethene (total)	13	U		21	U	
-Chloroform	13	U		21	U	
-1,2-Dichloroethane	13	U		21	U	
-2-Butanone	13	U		21	U	
-1,1,1-Trichloroethane	13	U		21	U	
-Carbon Tetrachloride	13	U		21	U	
-Bromodichloromethane	13	U		21	U	
-1,2-Dichloropropane	13	U		21	U	
-cis-1,3-Dichloropropene	13	U		21	U	
-Trichloroethene	13	U		21	U	
-Dibromochloromethane	13	U		21	U	
-1,1,2-Trichloroethane	13	U		21	U	
-Benzene	13	U		21	U	
-Trans-1,3-Dichloropropene	13	U		21	U	
-Bromoform	13	U		21	U	
-4-Methyl-2-Pentanone	13	U		21	U	
-2-Hexanone	13	U		21	U	
-Tetrachloroethene	4	J	✓	21	U	(1.2 ug/kg not reported)
-1,1,2,2-Tetrachloroethane	13	U		21	U	
-Toluene	44		✓ ← 2.5x higher	17	DJ	
-Chlorobenzene	13	U		21	U	
-Ethylbenzene	12	J	✓ ← 2.5x higher	5	DJ	
-Styrene	13	U		21	U	
-Xylene (total)	500	(E)	✓ ← 2.5x higher	200	D	

xylenes reported from 2 RTs, one peak within calib. range, 2nd peak just above (215 ug/L)

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

	EPA SAMPLE NO.	EPA SAMPLE NO.
	CJP62	CJP62DL

OMPUCHEM, RTP Contract: 68D00159

OM) Case No.: 17514 SAS No.: _____ SDG No.: CJP38 SDG No.: CJP38

il/water) SOIL Lab Sample ID: 467968 ID: 467968

ol 5.0 (g/mL) G Lab File ID: GH067968B13): CR067968B53

low/med) LOW Date Received: 12/06/91 ved: 12/06/91

n : dec. 37 Date Analyzed: 12/07/91 zed: 12/11/91

DB624 ____ ID: 0.530 (mm) Dilution Factor: 1.0 actor: 4.0

t me: _____ (uL) Soil Aliquot Volume: _____(uL) ot Volume: 100 (uL)

4g → 10 mL

100 ul → 5 mL

NO	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	ITS: UG/KG	Q
7-3	Chloromethane	16	U	7600	U
3-	Bromomethane	16	U	7600	U
1-	Vinyl Chloride	16	U	7600	U
0-5	Chloroethane	16	U	7600	U
9-2	Methylene Chloride	52	B ✓	8300	BD
4-	Acetone	90	B ✓	8300	BD
5-	Carbon Disulfide	16	U	7600	U
5-4	1,1-Dichloroethene	16	U	7600	U
4-3	1,1-Dichloroethane	10	J ✓	7600	U
59	1,2-Dichloroethene (total)	15	J ✓	7600	U
6-	Chloroform	16	U	7600	U
06-	1,2-Dichloroethane	16	U	7600	U
3-3	2-Butanone	16	U	7600	U
5-	1,1,1-Trichloroethane	16	U	7600	U
3-	Carbon Tetrachloride	16	U	7600	U
7-4	Bromodichloromethane	16	U	7600	U
7-	1,2-Dichloropropane	16	U	7600	U
1-	5 cis-1,3-Dichloropropene	16	U	7600	U
1-8	Trichloroethene	16	U	7600	U
48-1	Dibromochloromethane	16	U	7600	U
0-	1,1,2-Trichloroethane	16	U	7600	U
3-	Benzene	5	J ✓	7600	U
1-02-6	Trans-1,3-Dichloropropene	16	U	7600	U
5-2	Bromoform	16	U	7600	U
10	4-Methyl-2-Pentanone	16	U	7600	U
78	2-Hexanone	16	U	7600	U
18-4	Tetrachloroethene	19	✓	7600	U
4-5	1,1,2,2-Tetrachloroethane	16	U	7600	U
38	Toluene	3900	E	100000	D ✓
90	Chlorobenzene	16	U	7600	U
41-4	Ethylbenzene	1100	E	28000	D ✓
42-5	Styrene	16	U	7600	U
-2(7	Xylene (total)	8000	E	190000	D ✓

(2.5 x 50 x 4)

25X higher than initial analysis

both peaks within calibration range

1A
ORGANICS ANALYSIS DATA SHEET

	EPA SAMPLE NO.	EPA SAMPLE NO.
RTP Contract: 68D00159	CJP63	CJP63RE
Case No.: 17514 SAS No.:	SDG No.: CJP38	No.: CJP38
SOIL	Lab Sample ID: 467969	467969
5.0 (g/mL) G	Lab File ID: G2R67969C54	G4R67969B54
LOW	Date Received: 12/06/91	12/06/91
52	Date Analyzed: 12/12/91	12/16/91
D: 0.530 (mm)	Dilution Factor: 1.0	r: 1.0
(uL)	Soil Aliquot Volume: (uL)	olume: (uL)

COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	G	Q
Chloromethane	15	U	15	U
Bromomethane	15	U	15	U
Vinyl Chloride	15	U	15	U
Chloroethane	15	U	15	U
Methylene Chloride	81	B	110	B
Acetone	95	B	54	B
Carbon Disulfide	15	U	15	U
1,1-Dichloroethene	15	U	15	U
1,1-Dichloroethane	15	U	15	U
1,2-Dichloroethene (total)	15	U	15	U
Chloroform	15	U	15	U
1,2-Dichloroethane	15	U	15	U
2-Butanone	15	U	15	U
1,1,1-Trichloroethane	15	U	15	U
Carbon Tetrachloride	15	U	15	U
Bromodichloromethane	15	U	15	U
1,2-Dichloropropane	15	U	15	U
cis-1,3-Dichloropropene	15	U	15	U
Trichloroethene	7	J	11	J
Dibromochloromethane	15	U	15	U
1,1,2-Trichloroethane	15	U	15	U
Benzene	15	U	15	U
Trans-1,3-Dichloropropene	15	U	15	U
Bromoform	15	U	15	U
4-Methyl-2-Pentanone	15	U	15	U
2-Hexanone	15	U	15	U
Tetrachloroethene	5	J	11	J
1,1,2,2-Tetrachloroethane	15	U	15	U
Toluene	15	U	3	J B
Chlorobenzene	15	U	15	U
Ethylbenzene	15	U	15	U
Styrene	15	U	15	U
Xylene (total)	15	U	15	U

2C
WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: COMPUCHEM,RTP Contract: 68D00159

Lab Code: COMPU Case No.: 17514 SAS No.: _____ SDG No.: CJP21

	EPA SAMPLE NO.	S1 (NBZ) #	S2 (FBP) #	S3 (TPH) #	S4 (PHL) #	S5 (2FP) #	S6 (TBP) #	S7 (2CP) #	S8 (DCB) #	TOT OUT
01	CJP21	96	93	120	107	117 *	83	73	82	1
02	CJP22	78	86	103	88	94	88	60	71	0
03	CJP23	91	86	123	105	114 *	99	73	79	1
04	CJP24	96	100	111	106	111 *	106	73	87	1
05	CJP25	74	81	86	88	91	85	60	73	0
06	CJP26	62	66	66	82	90	63	59	76	0
07	CJP27	60	71	77	78	79	77	53	63	0
08	CJP28	78	84	98	87	93	89	64	81	0
09	CJP29	53	63	80	79	93	69	56	72	0
10	CJP30	90	97	104	91	94	117	67	84	0
11	CJP66	94	91	130	90	94	104	68	86	0
12	CJP21MS	73	64	95	79	79	80	53	50	0
13	CJP21MSD	90	83	105	100	103	89	68	67	0
14	SBLK83	74	70	102	73	76	105	56	65	0
15	SBLK74	82	82	91	81	90	81	92	82	0

all Ok

		QC LIMITS	
S1 (NBZ)	= Nitrobenzene-d5	(35-114)	
S2 (FBP)	= 2-Fluorobiphenyl	(43-116)	
S3 (TPH)	= Terphenyl-d14	(33-141)	
S4 (PHL)	= Phenol-d5	(10-110)	
S5 (2FP)	= 2-Fluorophenol	(21-110)	
S6 (TBP)	= 2,4,6-Tribromophenol	(10-123)	
S7 (2CP)	= 2-Chlorophenol-d4	(33-110)	(advisory)
S8 (DCB)	= 1,2-Dichlorobenzene-d4	(16-110)	(advisory)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

3C

WATER SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: COMPUCHEM,RTP Contract: 68D00159

Lab Code: COMPU Case No.: 17514 SAS No.: _____ SDG No.: CJP21

Matrix Spike - EPA Sample No.: CJP21

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC LIMITS REC.
Phenol	75.00	0	64.00	85	12-110
2-Chlorophenol	75.00	0	57.70	77	27-123
1,4-Dichlorobenzene	50.00	0	29.70	59	36- 97
N-Nitroso-di-n-prop.(1)	50.00	0	39.80	80	41-116
1,2,4-Trichlorobenzene	50.00	0	33.70	67	39- 98
4-Chloro-3-methylphenol	75.00	0	70.30	94	23- 97
Acenaphthene	50.00	0	37.20	74	46-118
4-Nitrophenol	75.00	0	72.00	96 *	10- 80
,4-Dinitrotoluene	50.00	0	41.50	83	24- 96
Pentachlorophenol	75.00	0	62.80	84	9-103
Pyrene	50.00	0	43.90	88	26-127

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Phenol	75.00	79.50	106	22	42	12-110
2-Chlorophenol	75.00	72.70	97	23	40	27-123
1,4-Dichlorobenzene	50.00	40.10	80	30 *	28	36- 97
N-Nitroso-di-n-prop.(1)	50.00	48.40	97	19	38	41-116
',2,4-Trichlorobenzene	50.00	43.10	86	25	28	39- 98
-Chloro-3-methylphenol	75.00	81.80	109 *	15	42	23- 97
Acenaphthene	50.00	44.30	89	18	31	46-118
4-Nitrophenol	75.00	77.90	104 *	8	50	10- 80
2,4-Dinitrotoluene	50.00	43.60	87	5	38	24- 96
Pentachlorophenol	75.00	74.70	100	17	50	9-103
Pyrene	50.00	47.40	95	8	31	26-127

(1) N-Nitroso-di-n-propylamine

QU OK

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 1 out of 11 outside limits
Spike Recovery: 3 out of 22 outside limits

COMMENTS: CLP
CAP, HG911213C21,DF911213C21, , , ,

2D

SOIL SEMIVOLATILE SURROGATE RECOVERY

Lab Name: COMPUCHEM,RTP Contract: 68D00159

Lab Code: COMPU Case No.: 17514 SAS No.: _____ SDG No.: CJP38

Level:(low/med) LOW

	EPA SAMPLE NO.	S1 (NBZ) #	S2 (FBP) #	S3 (TPH) #	S4 (PHL) #	S5 (2FP) #	S6 (TBP) #	S7 (2CP) #	S8 (DCB) #	TOT OUT
01	CJP38	51	56	113	44	36	31	44	57	0
02	CJP52	74	78	154 *	42	17 *	0 *	29	78	3
03	CJP52RE	66	61	54	22 *	3 *	0 *	6 *	59	4
04	CJP53	58	63	135	40	25	4 *	35	63	1
05	CJP53RE	61	61	54	44	23 *	2 *	22	64	2
06	CJP54	72	69	80	62	45	14 *	41	69	1
07	CJP55 5X dil	66	60	71	20 *	0 D	0 D	0 D	63	1
08	CJP55RE	30	28 *	29	4 *	0 *	0 *	0 *	25	5
09	CJP56 5X DIL	70	67	77	61	43	0 D	40	65	0
0	CJP56RE no dil	67	63	52	30	7 *	0 *	10 *	58	3
11	CJP57 5X dil	35	36	43	0 D	0 D	0 D	0 D	35	0
12	CJP57RE 2X dil	52	52	32	8 *	0 * D	0 * D	0 * D	48	1
13	CJP58 5X dil	82	80	96	74	57	29	50	79	0
14	CJP59 25X DIL	103	117 *	214 *	78	52	0 D	60	110	2
15	CJP59RE	0 D	50	73	0 D	0 D	0 D	0 D	0 D	0
16	CJP60	61	ok 62	ok 62	ok 48	37	8 *	29	56	1
17	CJP60RE	28 L	ok 34 L	ok 42 L	ok 32 L	27 L	14 *	19 * L	22 L	2
18	CJP61	66	63	54	43	20 *	0 *	21	62	2
19	CJP61RE	49	46	55	41	44	13 *	27	38	1
20	CJP62 DIL 20X	0 D	0 D	84	0 D	0 D	0 D	0 D	0 D	0
21	CJP63	32	0 D	35	0 D	0 D	0 D	0 D	41	0
22	CJP64	0 D	0 D	48	30	29	0 D	0 D	0 D	0
23	CJP62MS	53	42	104	34	0 D	0 D	0 D	0 D	0
24	CJP62MSD	66	47	104	40	29	0 D	27	44	0
25	SBLK12	52	48	63	49	59	30	35	48	0
26	SBLK14	66	64	69	47	39	21	47	69	0
27	SBLK54	73	71	78	65	60	61	44	67	0

		QC LIMITS	
S1 (NBZ)	= Nitrobenzene-d5	(23-120)	
S2 (FBP)	= 2-Fluorobiphenyl	(30-115)	
S3 (TPH)	= Terphenyl	(18-137)	
S4 (PHL)	= Phenol-d5	(24-113)	
S5 (2FP)	= 2-Fluorophenol	(25-121)	
S6 (TBP)	= 2,4,6-Tribromophenol	(19-122)	
S7 (2CP)	= 2-Chlorophenol-d4	(20-130)	(advisory)
S8 (DCB)	= 1,2-Dichlorobenzene-d4	(20-130)	(advisory)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogates diluted out

3D

SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: COMPUCHEM,RTP Contract: 68D00159

Lab Code: COMPU Case No.: 17514 SAS No.: _____ SDG No.: CJP38

Matrix Spike - EPA Sample No.: CJP62 Level:(low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
Phenol	3940	0	1730	44	26- 90
2-Chlorophenol	3940	0	1220	31	25-102
1,4-Dichlorobenzene	2630	0	0	0 *	28-104
N-Nitroso-di-n-prop.(1)	2630	0	1950	74	41-126
1,2,4-Trichlorobenzene	2630	0	0	0 *	38-107
4-Chloro-3-methylphenol	3940	0	2660	68	26-103
Acenaphthene	2630	0	1470	56	31-137
4-Nitrophenol	3940	0	0	0 *	11-114
,4-Dinitrotoluene	2630	0	0	0 *	28- 89
entachlorophenol	3940	0	0	0 *	17-109
Pyrene	2630	1920	3420	57	35-142

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Phenol	3940	2120	54 ✓	20	35	26- 90
2-Chlorophenol	3940	1680	43 ✓	32	50	25-102
1,4-Dichlorobenzene	2630	0	0 *	0	27	28-104
N-Nitroso-di-n-prop.(1)	2630	2260	86 ✓	15	38	41-126
1,2,4-Trichlorobenzene	2630	1150	44 ✓	200 *	23	38-107
-Chloro-3-methylphenol	3940	3130	79 ✓	15	33	26-103
cenaphthene	2630	1700	65 ✓	15	19	31-137
4-Nitrophenol	3940	0	0 *	0	50	11-114
2,4-Dinitrotoluene	2630	2160	82 ✓	200 *	47	28- 89
Pentachlorophenol	3940	0	0 *	0	47	17-109
Pyrene	2630	3460	59 ✓	3	36	35-142

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 2 out of 11 outside limits
Spike Recovery: 8 out of 22 outside limits

COMMENTS: CLP
CAP, HG911223C07,DH911223C07, , , ,

1C

ILE ORGANICS ANALYSIS DATA SHEET

	EPA SAMPLE NO.	EPA SAMPLE NO.
	CJP52	CJP52RE

CP Contract: 68D00159

ase No.: 17514 SAS No.: _____ SDG No.: CJP38)G No.: CJP38

) SOIL Lab Sample ID: 467957): 467957

30.1 (g/mL) G Lab File ID: GH067957B07 GR067957A02

LOW Date Received: 12/06/91 l: 12/06/91

decanted: (Y/N) N Date Extracted: 12/11/91 :d: 12/27/91

t Volume: 500.0 (uL) Date Analyzed: 12/22/91 l: 01/03/92

2.0(uL) Dilution Factor: 1.0 or: 1.0

) pH: 7.2

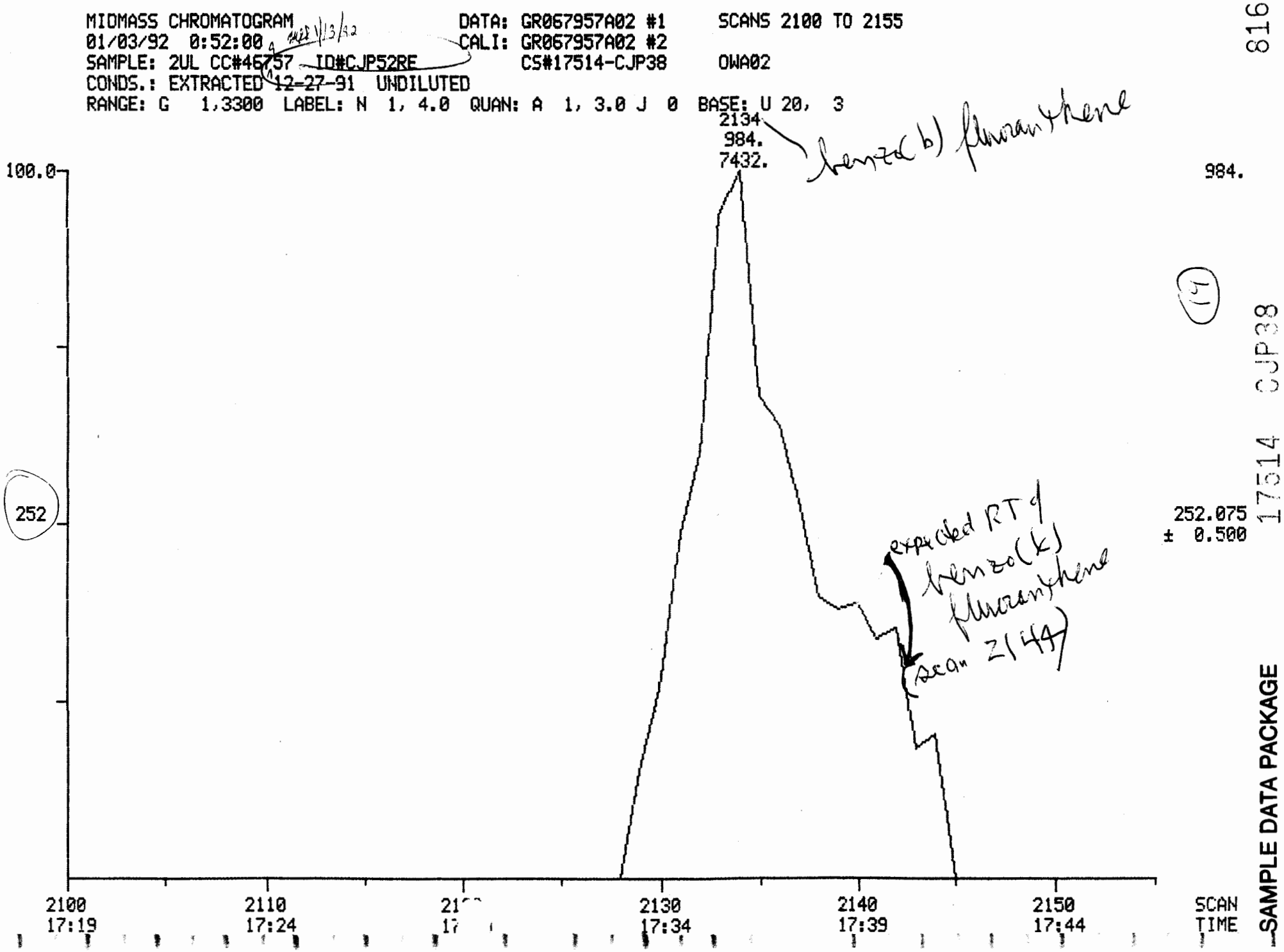
COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	TS: G/KG	Q
2,4-Dinitrophenol	1100	U	1100	U
4-Nitrophenol	1100	U	1100	U
--Dibenzofuran	470	U	470	U
2,4-Dinitrotoluene	470	U	470	U
Diethylphthalate	470	U	470	U
--4-Chlorophenyl-phenylether	470	U	470	U
--Fluorene	470	U	470	U
4-Nitroaniline	1100	U	1100	U
4,6-Dinitro-2-Methylphenol	1100	U	1100	U
--N-Nitrosodiphenylamine (1)	470	U	470	U
4-Bromophenyl-phenylether	470	U	470	U
Hexachlorobenzene	470	U	470	U
--Pentachlorophenol	1100	U	1100	U
--Phenanthrene	88	J ✓	470	U
nthracene	470	U	470	U
--Carbazole	470	U	470	U
--Di-n-Butylphthalate	470	U	470	U
Fluoranthene	150	J	87	J ✓
Pyrene	280	J	65	J ✓
--Butylbenzylphthalate	470	U	470	U
3,3'-Dichlorobenzidine	470	U	470	U
Benzo(a)Anthracene	110	J ✓	470	U
--Chrysene	210	J ✓	470	U
--bis(2-Ethylhexyl)Phthalate	1800	✓	250	BJ
Di-n-Octyl Phthalate	470	U	470	U
Benzo(b)Fluoranthene	190	JX	(71)	JX ✓
--Benzo(k)Fluoranthene	~~190~~	~~JX~~	~~71~~	~~JX~~
Benzo(a)Pyrene	470	U	470	U
Indeno(1,2,3-cd)Pyrene	470	U	470	U
--Dibenz(a,h)Anthracene	470	U	470	U
Benzo(g,h,i)Perylene	470	U	470	U

2131
2146

e separated from Diphenylamine

high terphenyl surrogate

acceptable terphenyl surrogate 3/90


MIDMASS CHROMATOGRAM
01/03/92 0:52:00
SAMPLE: 2UL CC#46757 ID#CJP52RE
CONDS.: EXTRACTED 12-27-91 UNDILUTED
RANGE: G 1,3300 LABEL: N 1, 4.0 QUAN: A 1, 3.0 J 0 BASE: U 20, 3
DATA: GR067957A02 #1
CALI: GR067957A02 #2
CS#17514-CJP38
SCANS 2100 TO 2155
OWA02
2134
984.
7432.
benzo(b) fluoranthene
100.0
252
984.
252.075
± 0.500
expected RT of benzo(k) fluoranthene
scan 2144
2100
17:19
2110
17:24
2130
17:34
2140
17:39
2150
17:44
SCAN
TIME
816
17514 CJP38
SAMPLE DATA PACKAGE

1C

LATILE ORGANICS ANALYSIS DATA SHEET

	EPA SAMPLE NO.	EPA SAMPLE NO
	CJP53	CJP53RE

HEM,RTP Contract: 68D00159

Case No.: 17514 SAS No.: _____ SDG No.: CJP38 DG No.: CJP38

ter) SOIL Lab Sample ID: 467959 D: 467959

30.2 (g/mL) G Lab File ID: GH067959B07 GR067959A02

ec LOW Date Received: 12/06/91 d: 12/06/91

26 decanted: (Y/N) N Date Extracted: 12/11/91 ed: 12/27/91

ra t Volume: 500.0 (uL) Date Analyzed: 12/22/91 d: 01/02/92

: 2.0(uL) Dilution Factor: 1.0 tor: 1.0

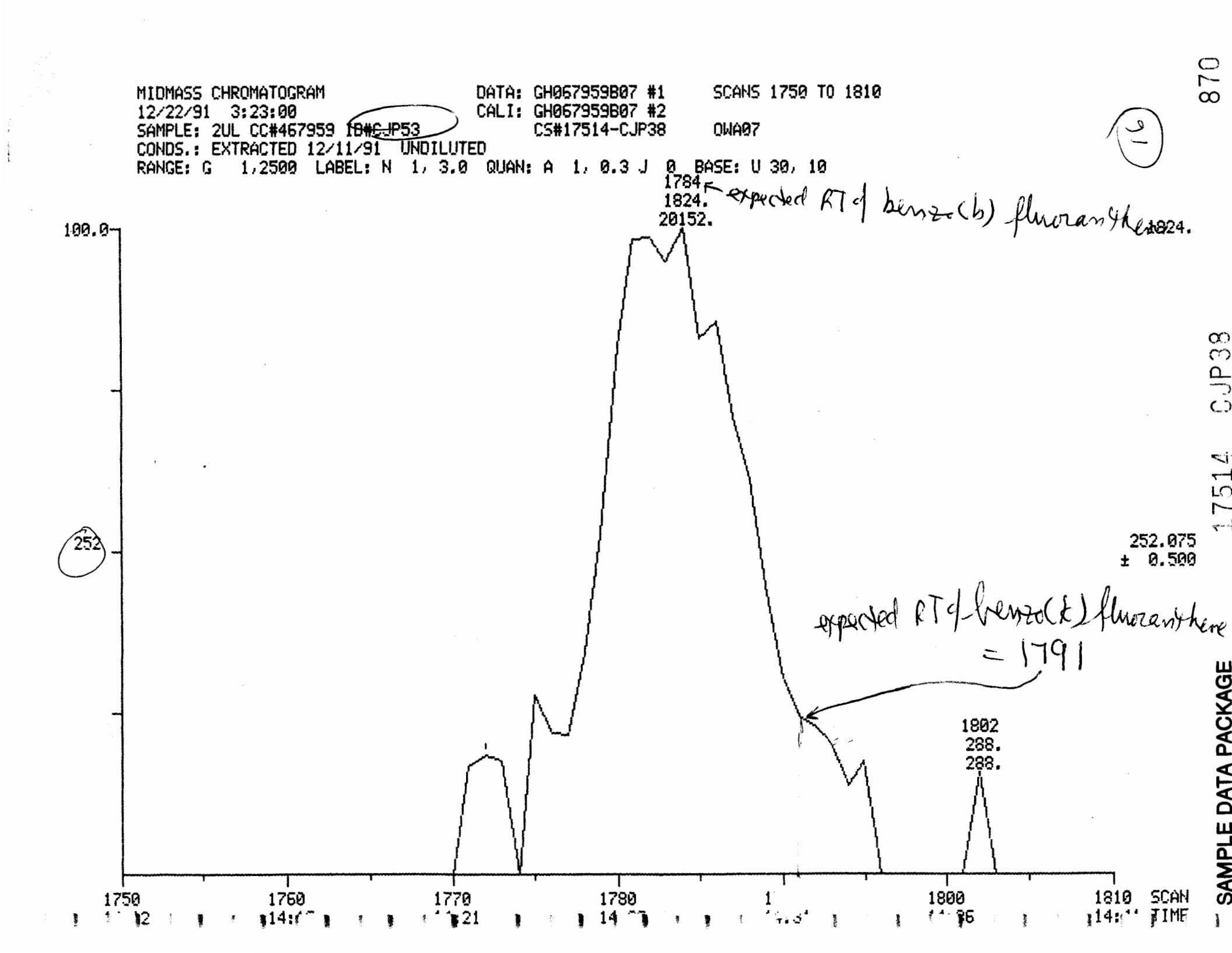
Y/) Y pH: 7.4

COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q		ITS: UG/KG	Q
--------2,4-Dinitrophenol	1100	U		1100	U
-- -----4-Nitrophenol	1100	U		1100	U
---------Dibenzofuran	440	U		440	U
--------2,4-Dinitrotoluene	440	U		440	U
-- -----Diethylphthalate	440	U		440	U
-- -----4-Chlorophenyl-phenylether	440	U		440	U
--------Fluorene	440	U		440	U
--------4-Nitroaniline	1100	U		1100	U
-- -----4,6-Dinitro-2-Methylphenol	1100	U		1100	U
---- --N-Nitrosodiphenylamine (1)	440	U		440	U
---- --4-Bromophenyl-phenylether	440	U		440	U
-- -----Hexachlorobenzene	440	U		440	U
-- -----Pentachlorophenol	1100	U		1100	U
--------Phenanthrene	190	J	✓	65	J
-- -----Anthracene	440	U		440	U
-- -----Carbazole	440	U		440	U
--------Di-n-Butylphthalate	440	U		440	U
--------Fluoranthene	320	J	✓	120	J
-- -----Pyrene	490		✓	79	J
----------Butylbenzylphthalate	440	U		440	U
--------3,3'-Dichlorobenzidine	440	U		440	U
-- -----Benzo(a)Anthracene	160	J	✓	440	U
-- -----Chrysene	170	J		57	J
--------bis(2-Ethylhexyl)Phthalate	300	J	B	150	BJ ✓
--------Di-n-Octyl Phthalate	440	U		440	U
-- -----Benzo(b)Fluoranthene	370	J	✓	80	J
--------Benzo(k)Fluoranthene	~~370~~	~~J~~		440	U END
--------Benzo(a)Pyrene	440	U		440	U
-- -----Indeno(1,2,3-cd)Pyrene	440	U		440	U
-- -----Dibenz(a,h)Anthracene	440	U		440	U
--------Benzo(g,h,i)Perylene	440	U		440	U

15

ot e separated from Diphenylamine

both terphenyl surrogates


MIDMASS CHROMATOGRAM
12/22/91 3:23:00
SAMPLE: 2UL CC#467959 IB#CJP53
CONDS.: EXTRACTED 12/11/91 UNDILUTED
RANGE: G 1,2500 LABEL: N 1, 3.0 QUAN: A 1, 0.3 J 0 BASE: U 30, 10
DATA: GH067959B07 #1
CALI: GH067959B07 #2
CS#17514-CJP38
SCANS 1750 TO 1810
QWA07
1784
1824.
20152.
expected RT of benzo(b) fluoranthene 1824.
100.0
252
252.075
± 0.500
expected RT of benzo(k) fluoranthene
= 1791
1802
288.
288.
1750
1760
1770
1780
1800
1810 SCAN
TIME
870
17514 CJP38
SAMPLE DATA PACKAGE

MIDMASS CHROMATOGRAM
12/23/91 10:19:00
SAMPLE: 2UL CC#467960 IO#CJP54
CONDS.: EXTRACTED 12/11/91 1: 5 DILUTION
RANGE: G 1,2500 LABEL: N 1, 4.0 QUAN: A 1, 3.0 J 0 BASE: U 20, 3

DATA: GD067960C07 #1
CALI: GD067960C07 #2
CS#17514-CJP38

SCANS 1730 TO 1790

OWA07

(17)

984

CJP38

17514

1761
31936.
240600.

predicted RT (1760) for benzo(b)fluoranthene

31936.

100.0

252

IS 5 = 1582
IS 6 = 1943

B(b) pred = 1760
B(k) pred = 1766

predicted RT for benzo(k)fluoranthene = 1766 or 1767

252.075
± 0.500

1781
3992.
18504.

1730
14:02

1740
14:07

1760

1780

1790

SAMPLE DATA PACKAGE

Submitted by: 7 Analyst: 917 Acct. No.:

AMOUNT=AREA * REF AMNT/(REF AREA * RESP FACT)
Resp. fac. from Library Entry

ContCal STD:12/23

No	Name
51	444 PHENANTHRENE (Q4#7) <85-01-8>
52	583 CARBAZOLE
53	403 ANTHRACENE (Q4#8) <120-12-7>
54	426 DI-N-BUTYL PHTHALATE (Q4#9) <84-74-2>
55	431 FLUORANTHENE (Q4#10) <206-44-0>
56	*459 D12-CHRYSENE (IS#5)
57	445 PYRENE (Q5#3) <129-00-0>
58	415 BUTYLBENZYL PHTHALATE (Q5#4) <85-68-7>
59	423 3,3'-DICHLOROBENZIDINE (Q5#5) <91-94-1>
60	405 BENZO(A)ANTHRACENE (Q5#6) <56-55-3>
61	413 BIS(2-ETHYLHEXYL) PHTHALATE (Q5#7) <117-81-7>
62	418 CHRYSENE (Q5#8) <218-01-9>
63	*497 D12-PERYLENE (IS#6)
64	429 DI-N-OCTYL PHTHALATE (Q6#2) <117-84-0>
65	407 BENZO(B)FLUORANTHENE (Q6#3) <205-99-2>
66	409 BENZO(K)FLUORANTHENE (Q6#4) <207-08-9>
67	406 BENZO(A)PYRENE (Q6#5) <50-32-8>
68	437 INDENO(1,2,3-C,D)PYRENE (Q6#6) <193-39-5>
9	419 DIBENZO(A,H)ANTHRACENE (Q6#7) <53-70-3>
0	408 BENZO(G,H,I)PERYLENE (Q6#8) <191-24-2>
71	#619 2-FLUOROPHENOL (SS#1)
72	#612 D5-PHENOL (SS#2)
73	#634 2-CHLOROPHENOL-D4 (SS#3)
74	#570 1,2-DICHLOROBENZENE-D4 (SS#4)
75	#447 D5-NITROBENZENE (SS#5)
76	#448 2-FLUOROBIPHENYL (SS#6)
77	#628 2,4,6-TRIBROMOPHENOL (SS#7)
78	#496 D14-TERPHENYL (SS#8)

No	m/z	Scan	Time	Ref	RRT	Meth	Area(Hght)	Amount	%Tot
51	178	1234	10:00	45	1.002	A BV	288520.	25.000 NG	1.30
52	167	1262	10:14	45	1.025	A BB	215232.	25.000 NG	1.30
53	178	1241	10:04	45	1.008	A VB	270696.	25.000 NG	1.30
54	149	1303	10:34	45	1.058	A BB	362528.	25.000 NG	1.30
5	202	1392	11:17	45	1.131	A BB	261304.	25.000 NG	1.30
56	240	1582	12:50	56	1.000	A BB	155576.	20.000 NG	1.04
57	202	1423	11:32	56	0.899	A BB	273072.	25.000 NG	1.30
58	149	1501	12:10	56	0.949	A BB	132976.	25.000 NG	1.30
59	252	1574	12:46	56	0.995	A BB	67048.	25.000 NG	1.30
60	228	1581	12:49	56	0.999	A BV	231016.	25.000 NG	1.30
61	149	1574	12:46	56	0.995	A BV	187448.	25.000 NG	1.30
62	228	1586	12:52	56	1.003	A VB	198744.	25.000 NG	1.30
63	264	1842	14:56	63	1.000	A BB	150712.	20.000 NG	1.04
64	149	1671	13:33	63	0.907	A BB	288552.	25.000 NG	1.30
65	252	1759	14:16	63	0.955	A BV	231096.	25.000 NG	1.30

SAMPLE DATA PACKAGE 17514 CJP38 1977

Quantitation Report File: HG911223C07

(18)

No	m/z	Scan	Time	Ref	RRT	Meth	Area(Hght)	Amount	%Tot
66	252	1765	14:19	63	0.958	A VB	201768.	25.000 NG	1.30
67	252	1830	14:50	63	0.993	A BV	197016.	25.000 NG	1.30
68	276	2145	17:24	63	1.164	A BB	209632.	25.000 NG	1.30
69	278	2148	17:25	63	1.166	A BB	169640.	25.000 NG	1.30
70	276	2239	18:09	63	1.216	A BB	183424.	25.000 NG	1.30

1C

ATILE ORGANICS ANALYSIS DATA SHEET

	EPA SAMPLE NO.	EPA SAMPLE NO.
	CJP55	CJP55RE

EM RTP Contract: 68D00159

Case No.: 17514 SAS No.: _____ SDG No.: CJP38 DG No.: CJP38

er) SOIL Lab Sample ID: 467961 D: 467961

30.0 (g/mL) G Lab File ID: GD067961C07 GRD67961A02

l) LOW Date Received: 12/06/91 d: 12/06/91

decanted: (Y/N) N Date Extracted: 12/11/91 ed: 12/27/91) 21 days

ic Volume: 500.0 (uL) Date Analyzed: 12/23/91 d: 01/03/92

2.0(uL) Dilution Factor: 5.0 tor: 1.0

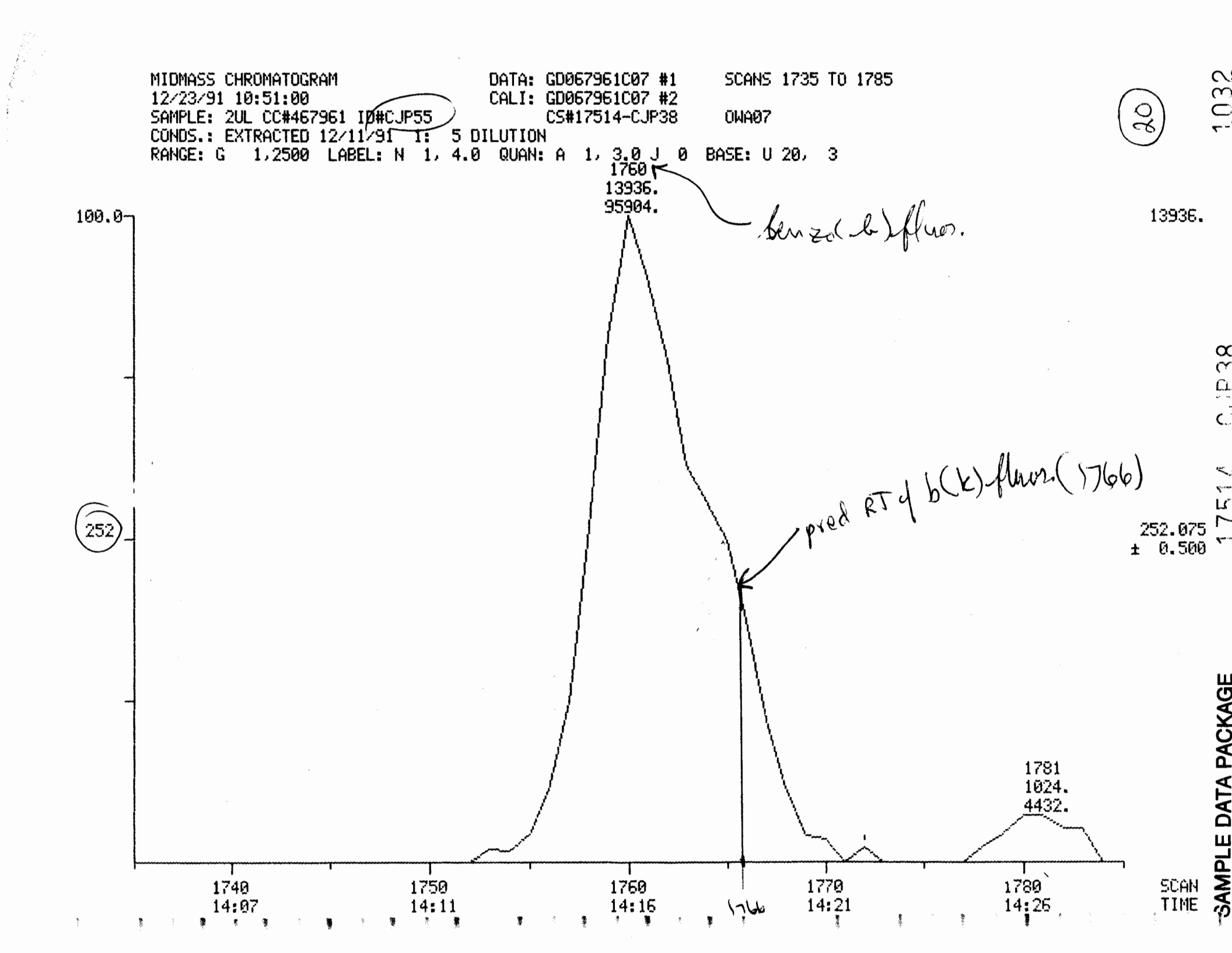
N Y pH: 7.5

COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q		UNITS: UG/KG	Q	
2,4-Dinitrophenol	5200	U		1000	U	
4-Nitrophenol	5200	U		1000	U	
Dibenzofuran	2100	U		430	U	
2,4-Dinitrotoluene	2100	U		430	U	
Diethylphthalate	2100	U		430	U	
4-Chlorophenyl-phenylether	2100	U		430	U	
Fluorene	2100	U		430	U	
4-Nitroaniline	5200	U		1000	U	
4,6-Dinitro-2-Methylphenol	5200	U		1000	U	
N-Nitrosodiphenylamine (1)	2100	U		430	U	
4-Bromophenyl-phenylether	2100	U		430	U	
Hexachlorobenzene	2100	U		430	U	IL
Pentachlorophenol	5200	U	IL	66	J ✓	
Phenanthrene	1300	J ✓	6.2	400	J	9.3
Anthracene	260	J ✓		430	U	
Carbazole	2100	U		430	U	
Di-n-Butylphthalate	2100	U		430	U	
Fluoranthene	2400	✓	11.4	1100		26
Pyrene	2200	✓	10.5	730		17.0
Butylbenzylphthalate	2100	U		430	U	
3,3'-Dichlorobenzidine	2100	U		430	U	
Benzo(a)Anthracene	1200	J ✓	5.7	410	J	9.5
Chrysene	1300	J ✓	6.2	500		11.6
bis(2-Ethylhexyl)Phthalate	230	J B		79	BJ ✓	
Di-n-Octyl Phthalate	2100	U		430	U	
Benzo(b)Fluoranthene	2800	✓	13.3	1700		39
Benzo(k)Fluoranthene	~~2800~~	~~X~~		~~1700~~	~~X~~	
Benzo(a)Pyrene	940	J ✓	4.5	220	J	5.1
Indeno(1,2,3-cd)Pyrene	570	J ✓	2.7	380	J	8.8
Dibenz(a,h)Anthracene	2100	U		120	J ✓	
Benzo(g,h,i)Perylene	490	J ✓	2.3	180	J	4.2

be separated from Diphenylamine

B-N surrogates substantially higher in dilution

(19)


MIDMASS CHROMATOGRAM
12/23/91 10:51:00
SAMPLE: 2UL CC#467961 ID#CJP55
CONDS.: EXTRACTED 12/11/91 I: 5 DILUTION
RANGE: G 1,2500 LABEL: N 1, 4.0 QUAN: A 1, 3.0 J 0 BASE: U 20, 3
DATA: GD067961C07 #1
CALI: GD067961C07 #2
CS#17514-CJP38
SCANS 1735 TO 1785
OWA07
20
1760
13936.
95904.
benzo(b)fluor.
13936.
100.0
252
pred RT of b(k)fluor.(1766)
252.075
± 0.500
1781
1024.
4432.
1740
14:07
1750
14:11
1760
14:16
1766
1770
14:21
1780
14:26
SCAN
TIME
1032
CJP38
17514
SAMPLE DATA PACKAGE

1B

AT LE ORGANICS ANALYSIS DATA SHEET

	EPA SAMPLE NO.	EPA SAMPLE NO.
	CJP56	CJP56RE

EM RTP Contract: 68D00159

Case No.: 17514 SAS No.: _____ SDG No.: CJP38 | DG No.: CJP38

er SOIL Lab Sample ID: 467962 | D: 467962

30.1 (g/mL) G Lab File ID: GD067962C07 | GR067962A02

d) LOW Date Received: 12/06/91 | d: 12/06/91

7 decanted: (Y/N) N Date Extracted: 12/11/91 | ed: 12/27/91

act Volume: 500.0 (uL) Date Analyzed: 12/23/91 | d: 01/03/92

2.0(uL) Dilution Factor: 5.0 | tor: 1.0

/N) Y pH: 6.1

COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q		ITS: UG/KG	Q
---Phenol	2600	U		520	U
---bis(2-Chloroethyl)Ether	2600	U		520	U
-------2-Chlorophenol	2600	U		520	U
---1,3-Dichlorobenzene	2600	U		520	U
---1,4-Dichlorobenzene	2600	U		520	U
-------1,2-Dichlorobenzene	2600	U		520	U
----2-Methylphenol	2600	U		520	U
---2,2'-Oxybis(1-Chloropropane)	2600	U		520	U
-4-Methylphenol	2600	U		520	U
-N-Nitroso-Di-n-Propylamine	2600	U		520	U
---Hexachloroethane	2600	U		520	U
-------Nitrobenzene	2600	U		520	U
-------Isophorone	2600	U		520	U
---2-Nitrophenol	2600	U		520	U
---2,4-Dimethylphenol	2600	U		520	U
-------bis(2-Chloroethoxy)Methane	2600	U		520	U
-------2,4-Dichlorophenol	2600	U		520	U
---1,2,4-Trichlorobenzene	2600	U		520	U
-------Naphthalene	2600	U		520	U
-------4-Chloroaniline	2600	U		520	U
---Hexachlorobutadiene	2600	U		520	U
---4-Chloro-3-Methylphenol	2600	U		520	U
-------2-Methylnaphthalene	2600	U		520	U
---Hexachlorocyclopentadiene	2600	U		520	U
---2,4,6-Trichlorophenol	2600	U		520	U
-------2,4,5-Trichlorophenol	6300	U		1300	U
-------2-Chloronaphthalene	2600	U		520	U
---2-Nitroaniline	6300	U		1300	U
---Dimethyl Phthalate	2600	U	(21)	520	U
-------Acenaphthylene	2600	U		72	J ✓
---2,6-Dinitrotoluene	2600	U		520	U
---3-Nitroaniline	6300	U		1300	U
-------Acenaphthene	2600	U		520	U

1C

LATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO. CJP56

EPA SAMPLE NO. CJP56RE

HE.,RTP Contract: 68D00159

Case No.: 17514 SAS No.: _____ SDG No.: CJP38

cer) SOIL Lab Sample ID: 467962

30.1 (g/mL) G Lab File ID: GD067962C07

ed) LOW Date Received: 12/06/91

37 decanted: (Y/N) N Date Extracted: 12/11/91

ra t Volume: 500.0 (uL) Date Analyzed: 12/23/91

: 2.0(uL) Dilution Factor: 5.0

pH: 6.1

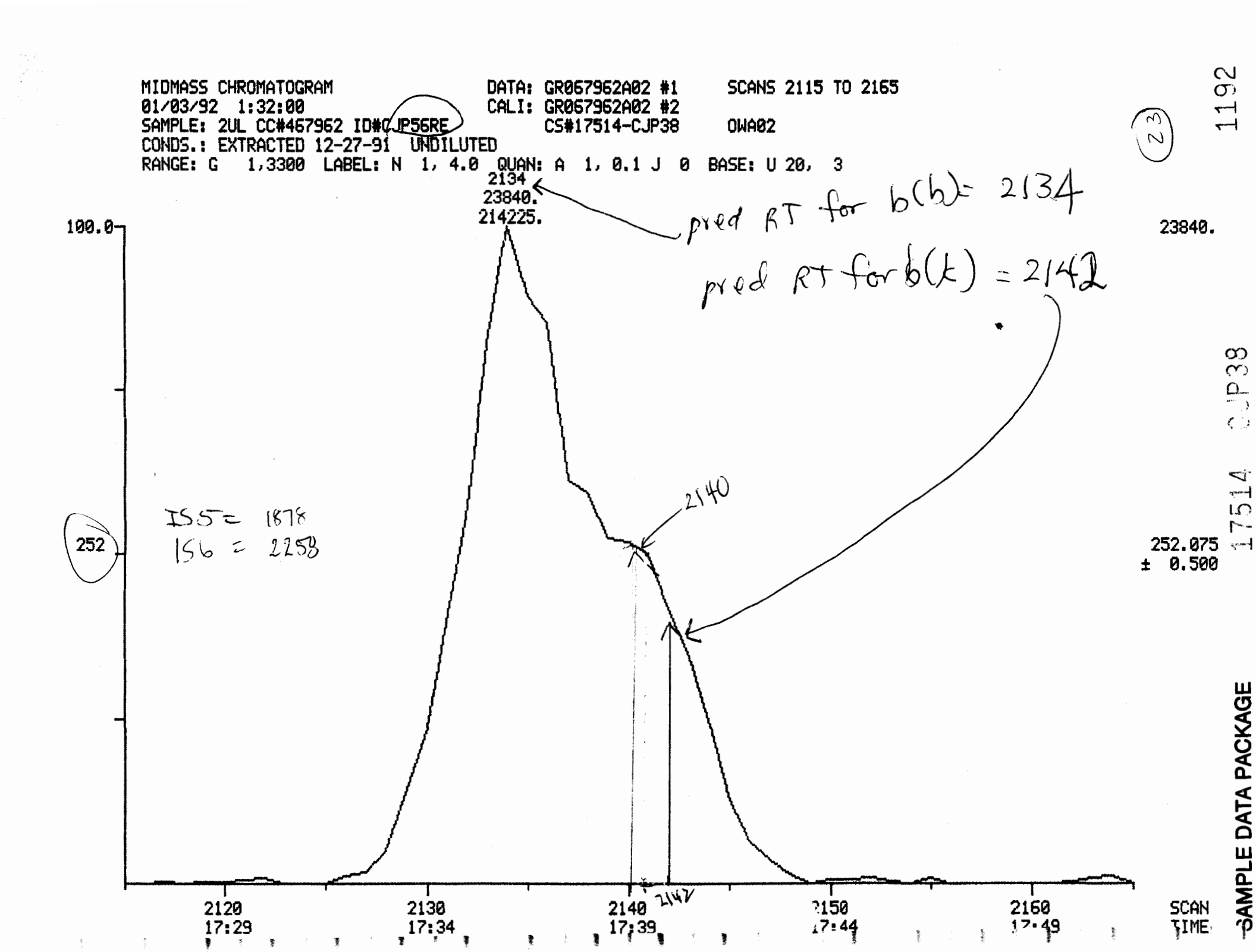
CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

COMPOUND		Q		
-------2,4-Dinitrophenol	6300	U	1300	U
-------4-Nitrophenol	6300	U	1300	U
-- ----Dibenzofuran	2600	U	520	U
---------2,4-Dinitrotoluene	2600	U	520	U
-------Diethylphthalate	2600	U	520	U
-- ----4-Chlorophenyl-phenylether	2600	U	520	U
-- ----Fluorene	2600	U	55	J ✓
-------4-Nitroaniline	6300	U	1300	U
-- ----4,6-Dinitro-2-Methylphenol	6300	U	1300	U
-- ----N-Nitrosodiphenylamine (1)	2600	U	520	U
--- -4-Bromophenyl-phenylether	2600	U	520	U
-------Hexachlorobenzene	2600	U	520	U
-- ----Pentachlorophenol	6300	U	1300	U
-- ----Phenanthrene	960	J	710	✓
-------Anthracene	2600	U	99	J ✓
-- ----Carbazole	2600	U	62	J
-- ----Di-n-Butylphthalate	2600	U	520	U
-------Fluoranthene	1900	J	1900	✓
-------Pyrene	1700	J	1100	✓
-- ----Butylbenzylphthalate	460	J B	520	U ✓
-------3,3'-Dichlorobenzidine	2600	U	520	U
-------Benzo(a)Anthracene	940	J	740	✓
-- ----Chrysene	1100	J	890	✓
-- ----bis(2-Ethylhexyl)Phthalate	2500	J B	240	BJ ✓
-------Di-n-Octyl Phthalate	2600	U	520	U
-- ----Benzo(b)Fluoranthene	2200	J X	2200	X ✓
-- ----Benzo(k)Fluoranthene	~~2200~~	~~J X~~	~~2200~~	~~X~~
-------Benzo(a)Pyrene	760	J	620	✓
-------Indeno(1,2,3-cd)Pyrene	330	J	1100	✓
-- ----Dibenz(a,h)Anthracene	2600	U	350	J ✓
-- ----Benzo(g,h,i)Perylene	2600	U	840	✓

: l : separated from Diphenylamine

(22)

B-N surrogate recoveries similar for both analyses


MIDMASS CHROMATOGRAM
01/03/92 1:32:00
SAMPLE: 2UL CC#467962 ID#CJP56RE
CONDS.: EXTRACTED 12-27-91 UNDILUTED
RANGE: G 1,3300 LABEL: N 1, 4.0 QUAN: A 1, 0.1 J 0 BASE: U 20, 3
DATA: GR067962A02 #1
CALI: GR067962A02 #2
SCANS 2115 TO 2165
CS#17514-CJP38
OWA02
1192
2134
23840.
214225.
pred RT for b(b)= 2134
pred RT for b(t) = 2142
100.0
23840.
IS5 = 1878
IS6 = 2258
252
2140
252.075
± 0.500
17514 CJP38
2142
2120
17:29
2130
17:34
2140
17:39
2150
17:44
2160
17:49
SCAN
TIME
SAMPLE DATA PACKAGE

AMOUNT=AREA * REF AMNT/(REF AREA * RESP FACT)
Resp. fac. from Library Entry

CCSTD 1/2192
≈ 1600 lbs

No	Name
51	444 PHENANTHRENE (Q4#7) <85-01-8>
52	583 CARBAZOLE
53	403 ANTHRACENE (Q4#8) <120-12-7>
54	426 DI-N-BUTYL PHTHALATE (Q4#9) <84-74-2>
55	431 FLUORANTHENE (Q4#10) <206-44-0>
56	*459 D12-CHRYSENE (IS#5)
57	445 PYRENE (Q5#3) <129-00-0>
58	415 BUTYLBENZYL PHTHALATE (Q5#4) <85-68-7>
59	423 3,3'-DICHLORDBENZIDINE (Q5#5) <91-94-1>
60	405 BENZO(A)ANTHRACENE (Q5#6) <56-55-3>
61	413 BIS(2-ETHYLHEXYL) PHTHALATE (Q5#7) <117-81-7>
62	418 CHRYSENE (Q5#8) <218-01-9>
63	*497 D12-PERYLENE (IS#6)
64	429 DI-N-OCTYL PHTHALATE (Q6#2) <117-84-0>
65	407 BENZO(B)FLUORANTHENE (Q6#3) <205-99-2>
66	409 BENZO(K)FLUORANTHENE (Q6#4) <207-08-9>
67	406 BENZO(A)PYRENE (Q6#5) <50-32-8>
68	437 INDENO(1,2,3-C,D)PYRENE (Q6#6) <193-39-5>
69	419 DIBENZO(A,H)ANTHRACENE (Q6#7) <53-70-3>
70	408 BENZO(G,H,I)PERYLENE (Q6#8) <191-24-2>
71	#619 2-FLUOROPHENOL (SS#1)
72	#612 D5-PHENOL (SS#2)
73	#634 2-CHLOROPHENOL-D4 (SS#3)
74	#570 1,2-DICHLOROBENZENE-D4 (SS#4)
75	#447 D5-NITROBENZENE (SS#5)
76	#448 2-FLUOROBIPHENYL (SS#6)
77	#628 2,4,6-TRIBROMOPHENOL (SS#7)
78	#496 D14-TERPHENYL (SS#8)

No	m/z	Scan	Time	Ref	RRT	Meth	Area(Hght)	Amount	%Tot
51	178	1444	11:55	45	1.003	A BV	264092.	25.000 NG	1.30
52	167	1478	12:11	45	1.026	A BV	188000.	25.000 NG	1.30
53	178	1453	11:59	45	1.009	A VB	247940.	25.000 NG	1.30
54	149	1530	12:37	45	1.062	A BB	369309.	25.000 NG	1.30
55	202	1637	13:30	45	1.137	A BB	243680.	25.000 NG	1.30
56	240	1877	15:29	56	1.000	A BB	131688.	20.000 NG	1.04
57	202	1675	13:49	56	0.892	A BV	251192.	25.000 NG	1.30
58	149	1775	14:38	56	0.946	A BV	150874.	25.000 NG	1.30
59	252	1868	15:25	56	0.995	A BB	33768.	25.000 NG	1.30
60	228	1875	15:28	56	0.999	A BV	187088.	25.000 NG	1.30
61	149	1872	15:26	56	0.997	A BV	214207.	25.000 NG	1.30
62	228	1882	15:31	56	1.003	A VB	177929.	25.000 NG	1.30
63	264	2254	18:36	63	1.000	A BB	49564.	20.000 NG	1.04
64	149	2018	16:39	63	0.895	A BB	325299.	25.000 NG	1.30
65	252	2131	17:35	63	0.945	A BV	82896.	25.000 NG	1.30

No	m/z	Scan	Time	Ref	RRT	Meth	Area(Hght)	Amount	%Tot
66	252	2139	17:39	63	0.949	A VB	88104.	25.000 NG	1.30
67	252	2235	18:26	63	0.992	A BB	63220.	25.000 NG	1.30
68	276	2715	22:24	63	1.205	A BV	43364.	25.000 NG	1.30
69	278	2730	22:31	63	1.211	A BB	39304.	25.000 NG	1.30
70	276	2861	23:36	63	1.269	A BB	39812.	25.000 NG	1.30
71	112	540	4:27	1	0.742	A BB	55740.	25.000 NG	1.30
72	99	673	5:33	1	0.924	A BB	81372.	25.000 NG	1.30
73	132	694	5:43	1	0.953	A BB	81468.	25.000 NG	1.30
74	152	750	6:11	1	1.030	A BB	55100.	25.000 NG	1.30

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